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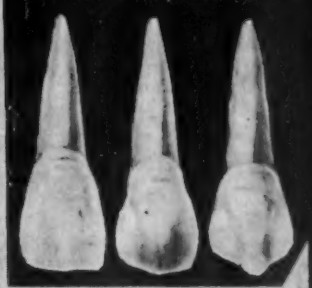

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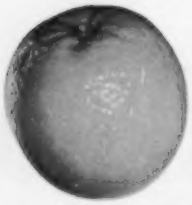

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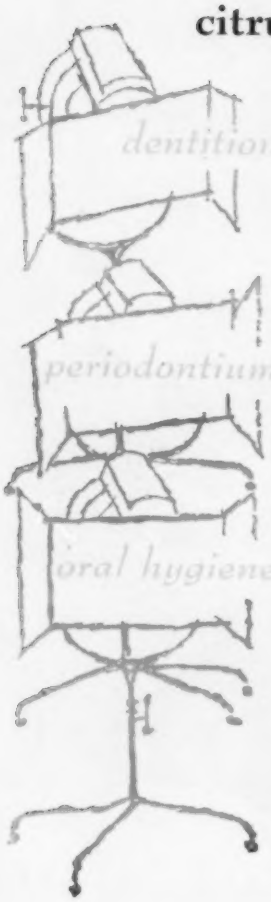

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1. King, C. G.: J. Am. Diet. A. 30:13, 1954.
2. Kelsten, L. B.: J. Dent. Med. 10:67, 1955.
3. Amer. Dent. Assoc.: Diet and Dental Health, Chicago, 1955, pp. 7-8.

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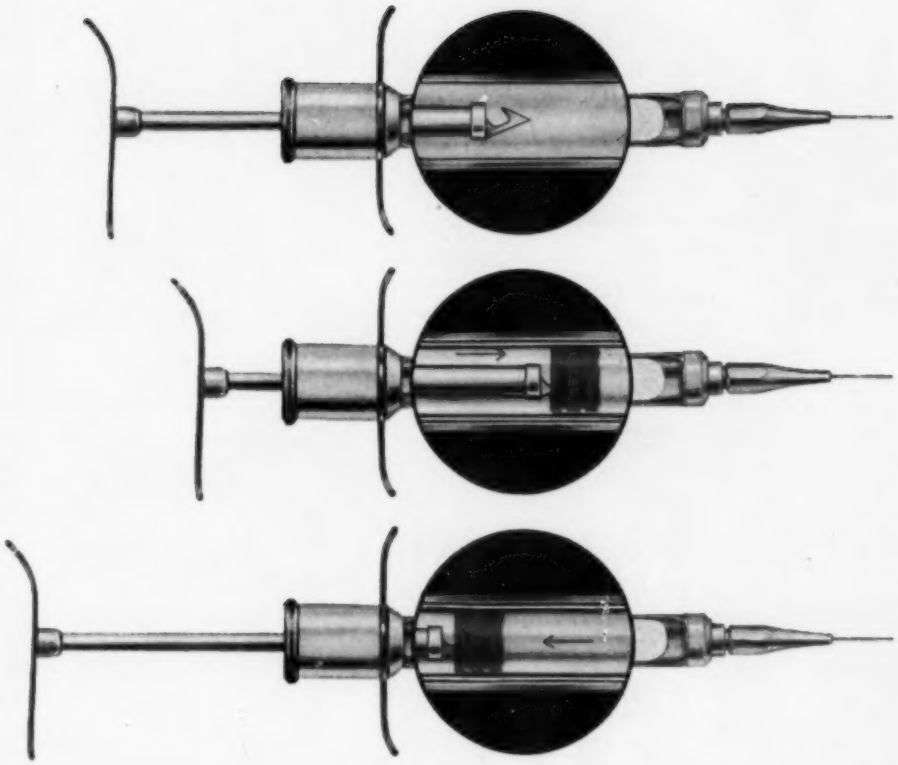

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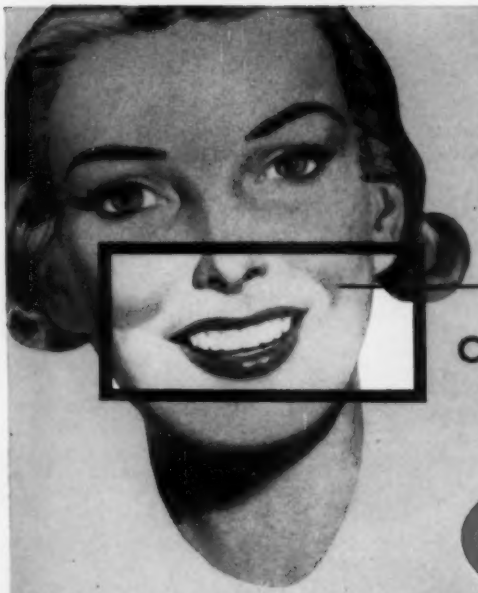

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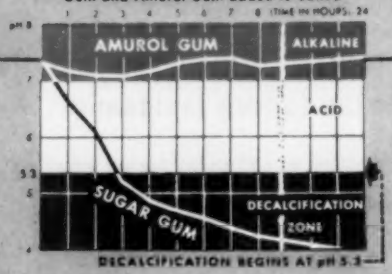

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DWG. A: Contact too broad occluso-gingivally.

DWG. B: Bucco-lingual contact area too broad.

DWG. C: Bucco-lingual contact area normal.

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In Drawing A of the mesio-distal section, for example, the contact is too broad in the occluso-gingival dimension, and stringy foods are apt to be caught and held.

The occlusal view in Drawing B shows a broad bucco-lingual contact area that prevents food from scouring the embrasures as it would, for example, in Drawing C where the contact is a normal one.

Drawing C, showing the normal contact area, obviously allows food to sweep into the embrasures which are so shaped as to provide a sluice-way effect with resulting tissue stimulation and self-cleansing action.

(Above prepared under the direction of George T. Cowger D.D.S.)

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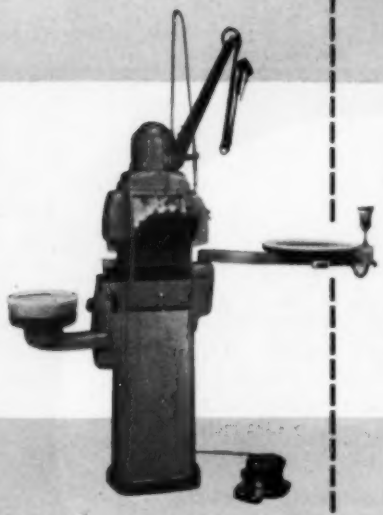

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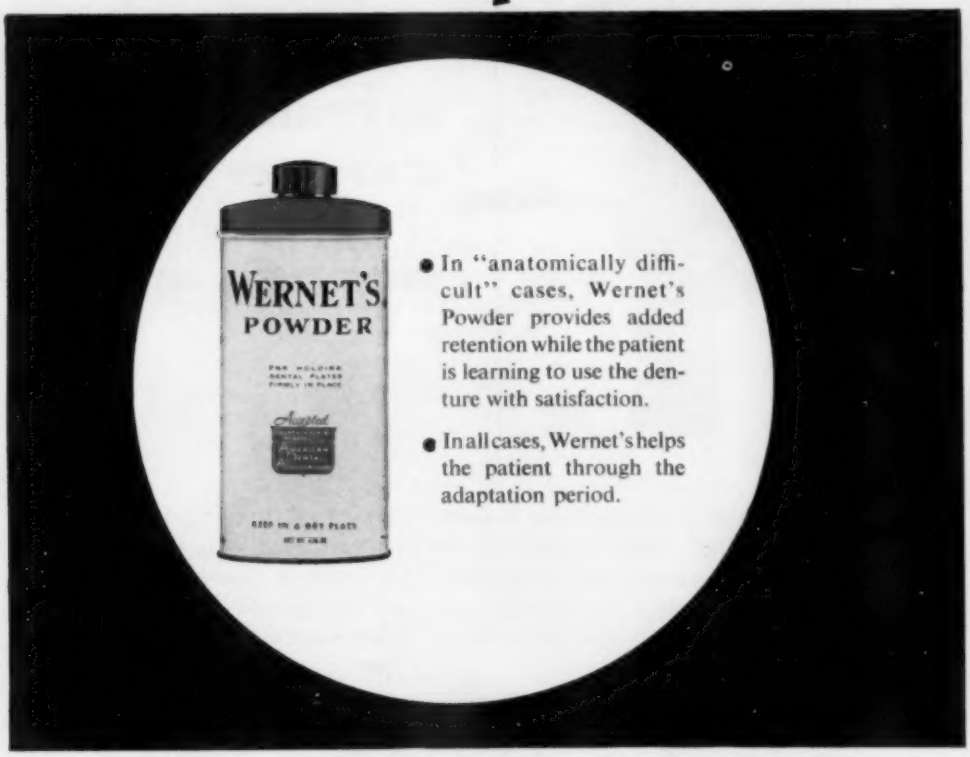

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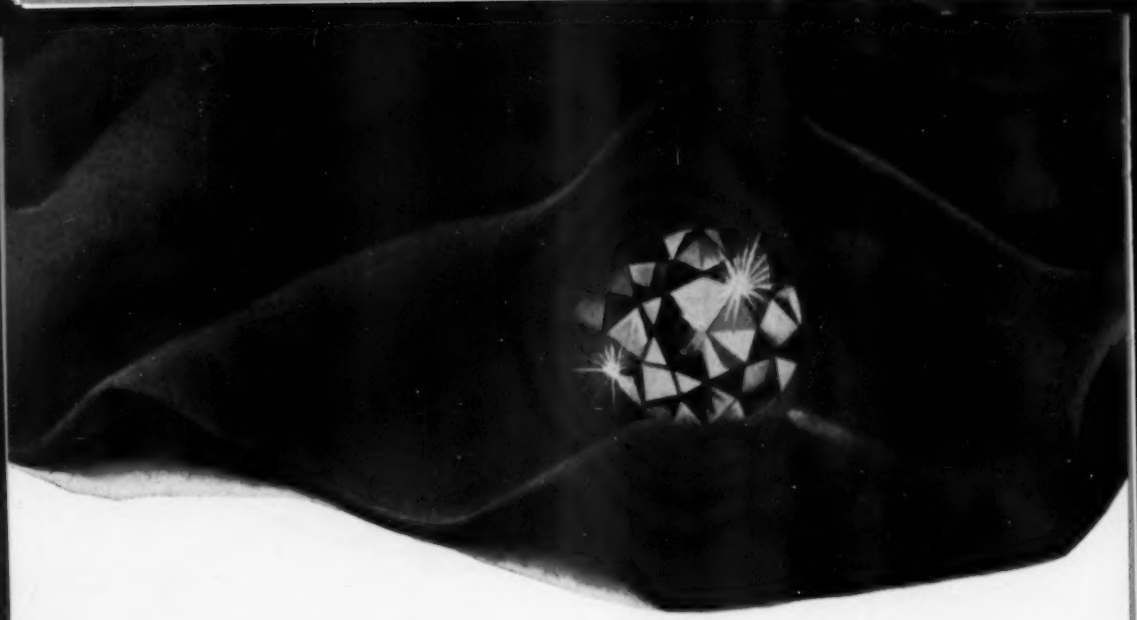

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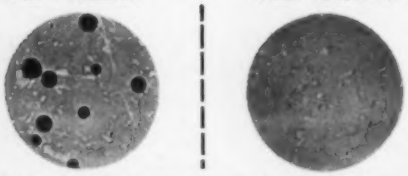

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Cavity preparation and matrixes for amalgam restorations

Gerald D. Stibbs, D.M.D., Seattle

After more than a century of use of amalgam dental restorations, there still remain some unanswered questions regarding its physical properties and the most satisfactory means of handling the material. Laboratory research and clinical application are making steady progress in answering these questions.

So far as cavity preparation and matrix construction and application are concerned, there is little or nothing really new. The basic principles, consolidated and published by G. V. Black in 1900, have held firmly through the years.[1-3] Ever since that time, the authors and teachers, when considering these particular phases of the subject, have had little choice but to reaffirm and re-emphasize the same doctrines. Granted, there have been some refinements in cavity form and in matrix management, but they have been minor.

Such being the case, why consider these same principles again and again? Why not proceed on the premise that the basic fundamentals have been presented adequately to the undergraduate. Perhaps the familiar statement, "What the world needs is not so much new knowledge as to be reminded of what it already knows,"[4] is pertinent here. An examination of the mouths of practically all of the dentulous patients who come to dental offices further emphasizes that need (Fig.1). It is unusual to see an amalgam restoration which has been in place for even six months that still is worthy of the creative operator's pride. Yet this is not the fault of the material as such. Amalgam can be transformed into one of the most permanent and serviceable restorative materials at the dentist's command

Professor and executive officer of the department of operative dentistry and professor of fixed partial dentures, School of Dentistry, University of Washington.

1. Black, G. V. An investigation of the physical characters of the human teeth in relation to their diseases, and to practical dental operations, together with the physical characters of filling materials. D. Cosmos 37:353 May 1895.

2. Johnson, C. N. A few considerations in filling teeth. D. Cosmos 40:723 Sept.; 811 Oct.; 907 Nov.; 987 Dec. 1898; 41:7 Jan.; 122 Feb. 1899.

3. Black, G. V. The value of exact methods in operative dentistry. D. Cosmos 42:1245 Dec. 1900.

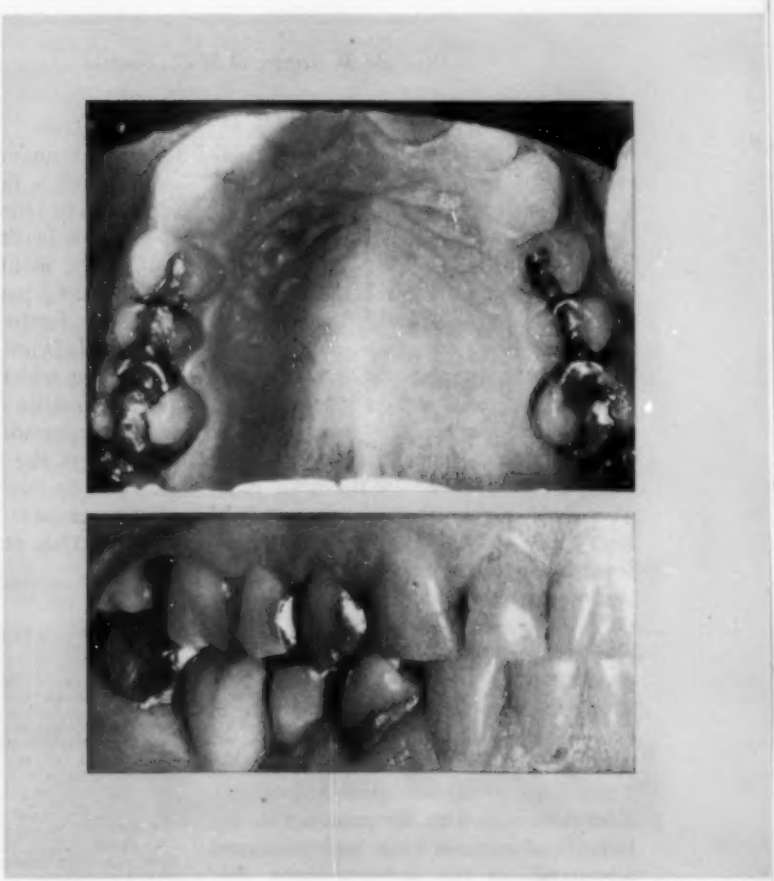
4. Ferrier, W. I. Cavity preparation for gold foil, gold inlay and amalgam operations. J. Nat. D. A. 4:441 May 1917.

if he will manipulate it properly and place it in a cavity that has been prepared properly (Fig. 2).

Failures in amalgam restorations are due chiefly to a lack of concentration and a lack of application in carrying out basic and essential steps in the procedure from the beginning until the restoration is completed. Therefore, it is well to review the rules again and again.

When considering failures in amalgam restorations, the reason first in sequence if not in importance is faulty diagnosis and treatment plan. This will not be elaborated on here, except to point out again that the fault is not reduced substantially simply by considering the size and location of the lesion, the number of cavities in a given mouth, and perhaps the economic status of the patient. A sound working knowledge of the physical properties of the restorative

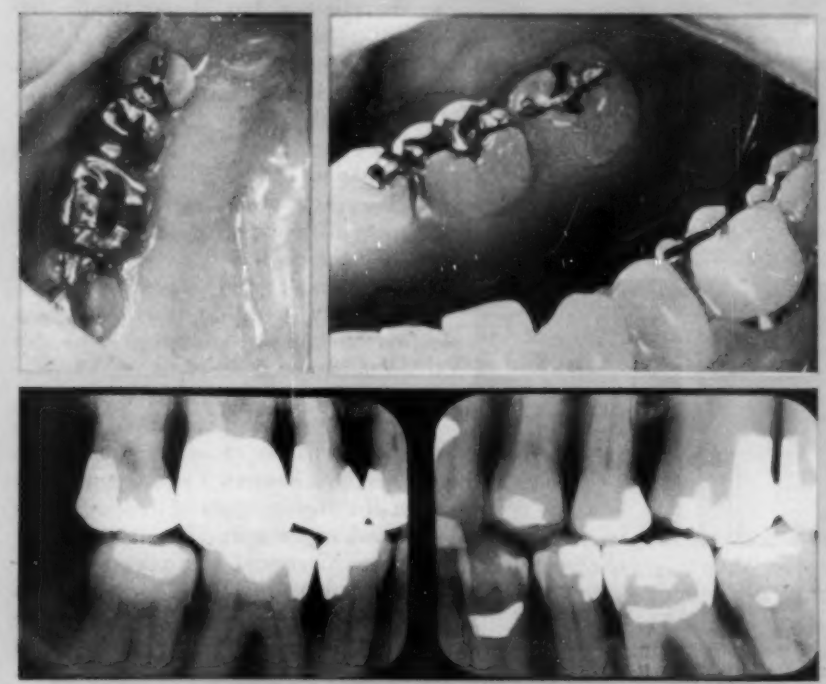
Fig. 1 • Amalgam fillings in which there is improper extension, poor condensation, inadequate form and marginal finish, and little or no attempt to reproduce normal tooth form



material is required, and a comprehension of the principles of cavity preparation so as to permit wise selection of material and thus ensure the best service in terms of health, comfort, function and esthetics for the patient.

Inadequate or improper cavity preparation is thought by many to be the most frequent cause of failure. It would seem that any operator could prepare a cavity which would be adequate for an amalgam restoration. Actually any operator can, but few do. Probably the best cavities that dentists have ever prepared were the ones produced during dental schooling, when each step in procedure had to pass inspection. The exceptions are to be found in general among those dentists who continue to subject themselves to supervision by working in some type of operative study club. The quality of work would improve immediately if

Fig. 2 • Amalgam restorations in upper right second molar has been in service at least 35 years, distal restoration in lower left second bicuspid for 20 years. Roentgenograms of restorations



each dentist would train himself to work at every cavity until he would be willing to submit it for inspection to a "conscience" or "supervisor."

CAVITY PREPARATION

It usually is more satisfactory to operate on a tooth which has been anesthetized; there is less strain on the patient and on the operator. In addition, anesthetizing a tooth helps to overcome the age-old fear the public has of dentistry. In this era of increased emphasis on speed, however, the operative dentist must remember that he is working with vital tissues. Teeth must not be overheated; they must not be desiccated.

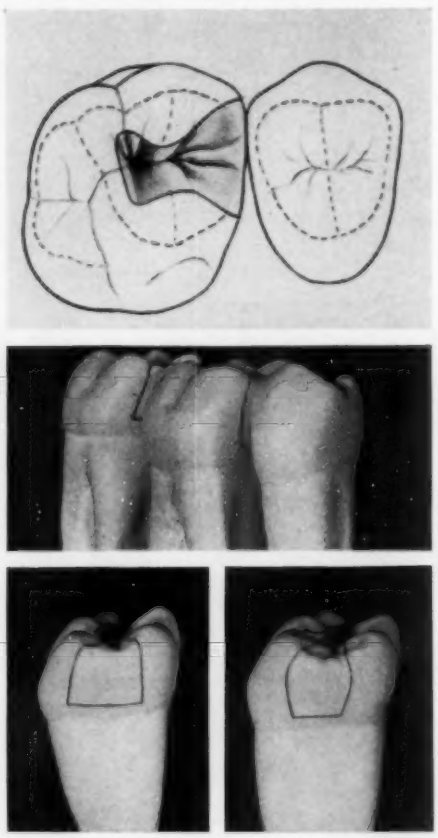


Fig. 3 • Above: Occlusal outline for amalgam in proximal cavity (courtesy of Stanley E. Sutcliffe). Center: Buccal outline, proximal portion of Class II cavity; first molar—proper extension in harmony with contour of line angle of proximal tooth; second molar—straight buccal wall occlusogingivally that produces excessive extension in gingival region. Below: Direct view of outlines shown in center picture. Outline on first molar, right, provides adequate extension, more esthetic result, and is more conservative

Two of the major requirements when preparing a cavity are that the operator be able to see what he is doing, and that the operating field be clean. Some feel that this can be achieved when water is used, or when the mouth is packed with absorbents of different kinds. If the dentist can do this with accuracy and dispatch and also have a really clean cavity, the procedure can be considered as acceptable. More and more of the careful operators, however, are reverting to the familiar, but almost totally discarded, rubber dam. It has always been conceded that a well-placed rubber dam affords the best operating field, but there have been objections to the time required to apply it. However, it has been found that ligation of the teeth is no longer necessary or even desirable. Present day technics offer the additional advantage of being the quickest means of establishing a desirable operating environment. The quality of all operative work is bound to improve considerably as this trend to increased use of the rubber dam continues.

As to the actual operation, each of Black's principles of cavity preparation must be kept in mind. Outline form must meet the requirements of proper extension and of esthetics (Fig. 3).

The achievement of proper resistance and retention form seems to be the step which is given less consideration in the preparation of a cavity for amalgam than any other phase of the work. It receives adequate attention when cavities are prepared for gold foil or gold inlays, but too often it is taken for granted in amalgam preparations.

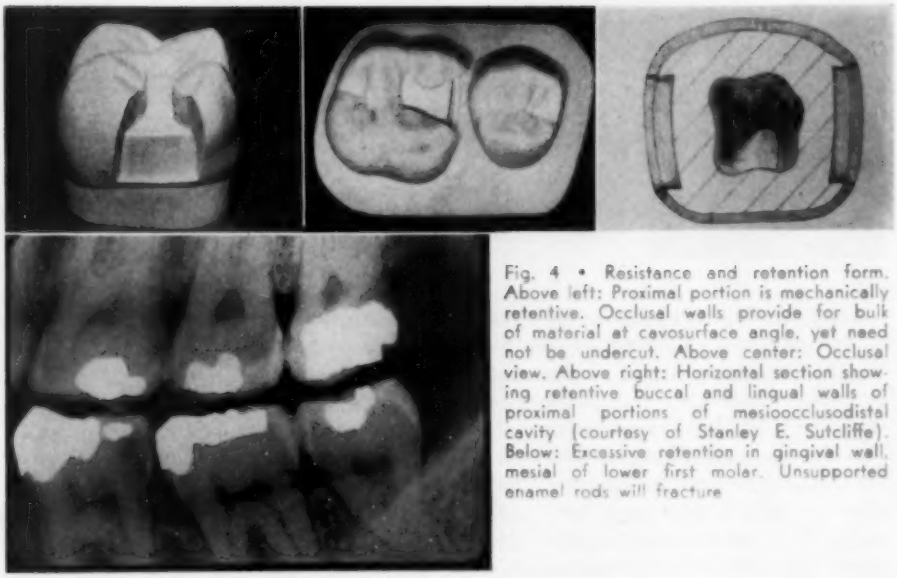


Fig. 4 • Resistance and retention form. Above left: Proximal portion is mechanically retentive. Occlusal walls provide for bulk of material at cavosurface angle, yet need not be undercut. Above center: Occlusal view. Above right: Horizontal section showing retentive buccal and lingual walls of proximal portions of mesiooccludodistal cavity (courtesy of Stanley E. Sutcliffe). Below: Excessive retention in gingival wall, mesial of lower first molar. Unsupported enamel rods will fracture.

There are two factors which should be kept in mind. The resistance and retention form must be adequate without weakening the tooth (Fig. 4). Retention is important in Class V cavities as well as in those in proximal surfaces (Fig. 5, left). The second factor is that the strength of the material makes it imperative that the bulk of the amalgam shall be sufficient to resist fracture. This provision for bulk is necessary not only in the isthmus of a cavity but also at the peripheral margin of the restoration (Fig. 5, right). Many more amalgam restorations fail at their cavosurface margins than in the occlusal isthmus. It requires diligent attention on the part of the operator if this error is to be avoided. Although abrasive paper disks are a help in establishing true margins for a cavity for a cast restoration, they should be avoided religiously when finishing the margins of a cavity for amalgam.

To secure retention form in the cavity, some operators favor acute line angles, others utilize channels or grooves. Whatever the form, the basic thought that should be kept in mind is that although the cavity definitely must be retentive, the enamel walls must not be deprived of dentinal support, tooth structure should not be sacrificed needlessly and the pulp must not be endangered.

The next factor which should be considered is the removal of carious dentin. Personal observation has led to the conclusion that this is the most grossly neglected step in all cavity preparations. It should be made clear that as used here, the term "carious dentin" applies to infected dentin or that which can be removed readily with a sharp excavator, and not to the hard, stained, sclerotic type of dentinal structure. Granted, some studies indicate that residual carious dentin will remain inactive if completely sealed off from contact with air or moisture.[5,6] Moreover, some medicaments will destroy microorganisms found in carious dentin. However, neither consideration is an excuse for deliberately leaving caries or debris in a cavity and

5. Basic, F. C. Fate of bacteria sealed in dental cavities. J. D. Res. 22:349 Oct. 1943.

6. Pickard, H. M. Cavity preparation for amalgam fillings. Brit. D. J. 96:59 Feb. 2, 1954.

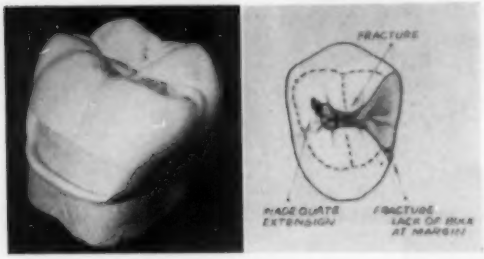


Fig. 5 • Left: In gingival third cavities, retention is definite, yet enamel rods must always be supported by sound dentin. Right: Usual sites of failures (courtesy of Stanley E. Sutcliffe)

placing over it a restoration of permanent nature, in the usual sense of the term. What assurance is there that the restoration will maintain the air-tight and water-tight seal? What assurance is there that the medication has penetrated to the depths of the carious material? Every effort should be made to preserve a vital pulp; any number of temporary treatments are justified to accomplish this end. When the permanent restoration is placed, the cavity should be as clean as it is possible to make it.

It is believed that most instances of residual carious dentin under restorations are the result of the operator actually not having seen the entire cavity. Although it is not impossible, it is extremely difficult and time-consuming to ensure the cleanliness of a cavity unless the rubber dam is in place. Even with the tooth isolated by a rubber dam, transillumination by means of a mouth lamp is advocated as a particularly valuable supplementary aid in finding last traces of caries. Too often the ultra-conservative operator defeats his own purpose when he attempts to preserve cusps or enamel walls which are undermined. It is almost impossible to excavate carious or weakened dentin completely from under a ledge of overhanging enamel. Such enamel should not be retained. In an effort to minimize the amount of tooth structure removed, however, an attempt often is made to retain it. Eventually the restoration fails, either because of the residual caries or because the unsupported enamel crumbles away.

Protection of the pulp is a factor which should be given attention. A lining or a cement base is helpful in the majority of cavities prepared for amalgam. The extra effort is more than balanced by the additional protection, service and comfort provided.

The final step in cavity preparation is finishing the enamel walls and performing the toilet of the cavity. This is just as important in a cavity prepared to receive amalgam as in one prepared for gold foil. In a Class II cavity, for example, the outline of the occlusal portion is smoothed to remove unnecessary curves or irregularities. The outline of the proximal portion is planed to a clean true line, in harmony with the general lines of the tooth and the contour of the approximating tooth. A freshly sharpened hand instrument accomplishes the finishing quickly but well. Of course, there are no cavosurface bevels as such, except perhaps for a short bevel on some gingival margins where short, unsupported enamel rods remain.

Occasionally, issue is taken with the stress laid on the planing and trueing of cavity margins on the grounds that it is a waste of time and that the restoration probably will not give any longer service as a result of the effort. However, cavity walls must be smooth or there is a danger of open, unfilled margins in the finished restoration. As to the efforts to establish absolutely true, perfect outlines and margins, part of a dentist's reward and satisfaction in life comes from the sense of having performed a task to the

best of his ability. Who can be proud of a restoration that shows the mark of shoddy or disinterested craftsmanship? A further consideration is that if an operator does not strive continually to improve his work, its quality will not remain on a steady plateau; it will degenerate rapidly, and that operator will find that as time passes he is satisfied with an ever poorer type of service. Actually it requires so little additional time to establish a crisp finish to a cavity and so make it a pleasure to view, that it seems foolish to stop just short of the goal.

MATRIXES

The condensing of amalgam into a compound cavity, or even into an unusually large single-surface cavity, requires the use of a matrix. No operator worthy of the name would advocate its omission or attempt to place amalgam without a matrix of some form in position.

Those who have given any thought at all to the matter agree that the requirements of a good matrix are that in supplying the missing wall or walls of a cavity it must be firm and unyielding; it must enable the restoration of the normal form, contour and function of the tooth with minimal effort, consistent with accurate results.

Many types of matrixes have been devised. The numerous mechanical designs present some advantages and are useful occasionally. They each meet some of the requirements of a matrix, notably that of supplying the missing wall. However, it is usually more difficult to fulfill the other requirements with these forms of matrixes than it is with the matrix that is individually constructed.

The custom matrix was advocated by G. V. Black.[7] Refinements have been suggested by Hollenback,[8] Sweeney,[9] and others. At first fabricating a matrix may seem time-consuming; however, after the technic has been learned and practiced for a while, it becomes much easier to place a custom-made matrix than the mechanical forms in all but a few instances. Ease of placement is not the most important factor, however. The prime consideration is that the reproduction of normal functional form is facilitated, and the matrix which is tailored to the individual restoration does this much better and much more readily than do the other forms. In the occasional instance, such as a distal cavity in the most posterior tooth in the arch, one of the mechanical types may serve even better than the custom-made matrix, and there it should be used.

Regardless of the type used, the matrix should be firm and unyielding. One of the best methods of achieving this is to reinforce the matrix metal with low fusing modeling compound. Again, regardless of the design of matrix, and even though it is reinforced, it also requires wedging at the gingival margin to produce the best results. Every effort must be made to eliminate a flashing or excess over the gingival margin. Even with a rubber dam in place and even with intraoral illumination to aid, it is extremely difficult and tedious to reduce the gingival contour so that it is smoothly continuous with the gingival tooth structure. It is even more difficult to polish this area properly.

It is much easier to produce a polished proximal surface, contact area and gingival margin, if the amalgam is condensed against a perfectly smooth steel surface that is fitted firmly and snugly against the gingival margin of the preparation and also against the contact area of the approximating tooth. A slight excess is permissible, of course, over the buccal and lingual margins of the proximal sur-

7. Black, G. V. Operative dentistry, vol. 2. Chicago, Medico-Dental Publishing Co., 1908, p. 325.

8. Hollenback, George M. The economic value of amalgam in operative dentistry and the technic of its use. J.A.D.A. 24:1318 Aug. 1937.

9. Sweeney, J. T. Amalgam manipulation: manual vs. mechanical aids. II. Comparison of clinical applications. J.A.D.A. 27:1940 Dec. 1940.

Fig. 6 • Left: Poor proximal contour, excessive contact and periodontally dangerous gingival flashing which occur easily when a mechanical matrix is used and no gingival wedge is placed. Below: Proximal surfaces restored. Some are acceptable. Mechanical matrix used on lower right first molar: both proximal surfaces are flat.

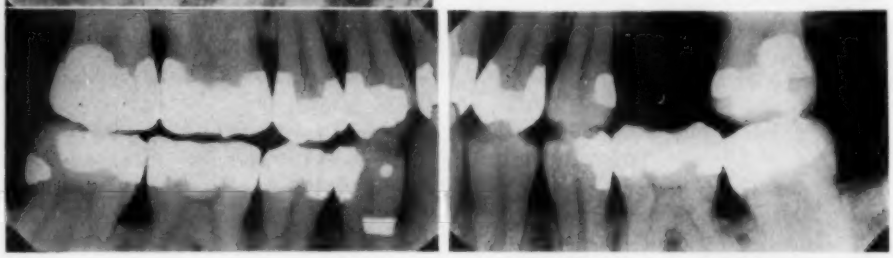


Fig. 7 • Clinical amalgam restorations that have been done by undergraduate students. Reproduction of tooth form, flush margins, and polished surfaces.

face of a restoration, for they can be trimmed and polished as can the other accessible areas of the amalgam.

It is difficult for the dentists who have used only the mechanical types of matrixes to become convinced of the merits in changing. To them their way seems much faster and just as good. Yet if they will look carefully at postoperative roentgenograms of their restorations they cannot help but be aware of the frequency with which results do not reflect careful workmanship (Fig. 6, left). The flat proximal surfaces and the high contact areas, to say nothing of the excess material in gingival areas, are most discouraging to the conscientious operator. Those who have not tried it are urged to give the individually constructed matrix a fair trial at least. A technic should be selected that offers the greatest ease of fabrication, and at first it should be used on the easier restorations. The immediate improvement in end results will more than compensate for the somewhat longer time the first few will require to make, and in a very short while the operator will find that the speed of application is equal to that achieved with the former technic (Fig. 6, below). With this, as with any procedure, practice makes perfect, and the pleasure of producing a restoration that looks and functions as a part of a natural tooth is one of the greatest satisfactions in dental practice (Fig. 7).

COMMENT

Care and diligence are required of the dentist if he is to utilize amalgam to the

utmost of its potentialities. Proper, careful cavity preparation is one of the most important factors in producing the best of amalgam restorations, just as it is with any other of the permanent restorative materials.

Of definite importance, too, is the utilization of a proper matrix where one is indicated. A well-formed matrix does much to produce the required form and function in an amalgam restoration with a minimal expenditure of effort and time.

Nothing is easy in operative dentistry. There is no place in fine operative practice for the one who is lazy or who cannot conform to basic requirements in procedure. This holds true not only when producing restorations of gold, but also when using any of the restorative materials, not the least of which is the one used most frequently, dental amalgam.

Failures in dental amalgam

Robert B. Wolcott, D.D.S., M.S., San Diego

A wise man once said, "In the wide arena of the world, failure and success are not accidents, as we so frequently suppose, but the strictest justice. If you do your fair day's work, you are certain to get your fair day's wage—in praise or pudding, whichever happens to suit your taste." Certainly the success and failure gained in the dental restorative arts are no longer accidents. For the past 100 years amalgam has become so well understood that success and failure can be predicted with fair accuracy.

Too often satisfaction with amalgam work is short-lived. In the early hours or days after its placement there seems to be justifiable pride in a task well done. Then, peculiar things begin to happen, and gradually, but surely, the technical details of the restoration are altered—margins collapse, caries recur, discoloration develops, or it cracks and loses its footing.

Every dentist has recognized that there are peculiar, unexplainable facts which are associated with this prediction of failure or success in restorations. It has been stated that restorations are not normally capable of producing perfect "seals" in the tooth[1] regardless of the time of service,[2] and yet caries recurrence around restorations can not be foretold. Experience with failure and success seems to relate principally to the evaluation of caries susceptibility of the patient and to the well established cardinal principles that can produce a sound restoration. Hovering over these idealistic principles are the ever-present problems presented by indifferent attitudes toward present-day understanding of dental caries. If oral hygiene, the diet and modern caries control measures are disregarded, even

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Captain, Dental Corps, U. S. Navy. Naval Training Center.

1. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

2. Crawford, W. H., and Larson, J. H. Fluid penetration between fillings and teeth using Ca^{45}. J. D. Res. 35:518 Aug. 1956.

the perfectly restored tooth can be destroyed.[3]

There are numerous factors which influence the life of amalgam, but only those factors which are most commonly neglected will be emphasized. Figure 1 gives a condensed reference to many of the commonly met failures of amalgam and the causes for these failures. It must be recognized that many of the discrepancies found in amalgam are not necessarily failures, but, for the sake of brevity, it is necessary to combine flaws and failures into one category.

CAVITY PREPARATION

It has been established that cavity preparation is more commonly linked with failures in amalgam than any other single consideration. Of those defects which may be associated with preparation the most frequent is inadequate extension:[4] thus caries recurrence seems inevitable, particularly in mouths with a high dental caries index. On the occlusal surface it is generally accepted that the preparations shall be extended fully to resistant boundaries but include all susceptible regions (Fig. 2). Deviations from this principle are so infrequently permissible that they shall not be considered an issue. The most common of all cavity preparation failures, however, is found where there is inadequate extension on the proximal surface.[5] If mechanical cleaning by brush or mastication is ineffectual in these areas, the restoration is quite likely doomed to fail, as illustrated in Figure 3. With the advent of the diamond proximal opening wheels and increased rotary speeds it is possible that there will be less proximal conservatism practiced, and margins will be fully extended to the classical self-cleansing area. However, these same instruments are capable of radical extensions which result in mutilations that must be replaced with restorations of questionable life expectancy, or leave a tooth which may be seriously weakened. Special caution must be directed to the lower bicuspids and the distal regions of the maxillary and mandibular first molars where frail walls can be formed easily.

A commonly observed flaw at the occlusal margins is the "ditching" that slowly develops as the filling is subjected to masticatory stress. It is wishful thinking to rely on amalgam to hide ragged or beveled cavosurface margins. These frail margins of amalgam crumble because of certain intrinsic weaknesses and because the strictest care has not been given to the finishing of the cavity margins. Figure 4 illustrates the creation and prevention of such ditching.

The marginal ridge discrepancies in Figure 5 are sufficiently common to suggest that they stem from carelessness rather than oversight, since they are the result of unnecessary flaring at the buccal or lingual walls or both as the proximal surface is being prepared. These flaws are not encountered immediately after the insertion of the restoration but are born in the preparation and mature as the weakened portions of the amalgam collapse under occlusal stress. To assure strong junctions between amalgam and tooth, regardless of its location, it is sound judgment to create full butt joints, particularly in those regions where occlusal stresses are to be encountered, but unnecessary extension in order to attain these full butt joints can invite weakening of the buccal or lingual walls and result in splitting of teeth.

Occasionally a compound amalgam restoration suffers a fracture through its bulk in the region of the occlusal constriction between cusps (Fig. 6). This failure is attributed to an inadequate proximal retention form which causes the proximal portion to rely completely

3. Markley, M. R. Amalgam restorations for Class V cavities. J.A.D.A. 50:301 March 1955.

4. Easton, G. S. Causes and prevention of amalgam failures. J.A.D.A. 28:392 March 1941.

5. Healey, H. J., and Phillips, R. W. Clinical study of amalgam failures. J. D. Res. 28:439 Oct. 1949.

EVIDENCES OF FAILURE IN AMALGAM

CAUSES OF FAILURE

	MARGINAL OVERHANGS	CONTACT AND CONTOUR FAILURES	GINGIVAL INFLAMMATION (SUBSEQUENT)	POST-OPERATIVE PAIN	MARGINAL DITCHING	RESTORATION FRACTURES (GROSS)		REDUCED STRENGTH (SOFT AMALGAM)	CARIES RECURRENCE	EXCESSIVE EXPANSION (BLISTERS BLOSSOMING ETC.)	TARNISH AND CORROSION
						MARGINAL RIDGE	ISTHMUS				
A CAVITY PREPARATION				1 PREOPERATIVE PATHOSIS OF PULP ETC. 2 LACK OF PULPAL AND DENTINAL CONSIDERATION DURING PREPARATION	OCCLUSAL - A) MARGINAL BEVELS B) UNDERMINED ENAMEL PROXIMAL A) FLARING OF WALLS	BEVELLING OR FLARING AT RIDGE AREA	1) INADEQUATE RESISTANCE FORM 2) ABNORMAL CONSTRICTION OF ISTHMUS 3) OCCLUSAL TRAUMA 4) INADEQUATE RETENTION		1) INADEQUATE CARIES REMOVAL 2) IMPROPER EXTENSIONS 3) SEE ALSO UNDER FRACTURES		
B MATRIX	LOSS OF ADAPTATION DUE TO INADEQUATE STABILITY DURING CONDENSATION	PROPER CONTACT AND CONTOUR NOT DEVELOPED IN MATRIX	1 GINGIVAL TRAUMA FROM OVERHANGS SEE B	1 TRAUMA OF OVERHANG TO PERIODONTIUM 2 EXCESSIVE MATRIX TRAUMA	EFFECTIVENESS OF CONDENSATION IS REDUCED WHEN AMALGAM CANNOT BE CONFINED WITHIN MATRIX, THEREBY LOWERING STRENGTH				MARGINAL OVERHANGS ARE SUSCEPTIBLE AREAS		POOR MATRIX ALLOWS FOR POORLY CONDENSED AMALGAM WHICH TARNISH AND CORRODE
C AMALGAM MANIPULATION 1) RATIO		SEE B C AND D UNDER FRACTURES			INCREASE MERCURY/ALLOY RATIO INCREASES MERCURY CONTENT OF AMALGAM, THEREBY REDUCING STRENGTH				FRACTURES OF RESTORATION MAY LEAD TO CARIES RECURRENCE. (SEE CAUSES UNDER FRACTURES)		GREATER IN AMALGAM WITH HIGH MERCURY CONTENT
2) TRITURATION		SEE B C AND D UNDER FRACTURES				STRENGTH REDUCED BY 1 UNDERTRITURATION 2 REWORKING BEYOND INITIAL SET 3 REPLASTICIZING WITH MERCURY 4 LARGE, SINGLE MIX				FILMING OF AMALGAM MAY CONTAMINATE SEE D ●	UNDERTRITURATED AMALGAMS TEND TO TARNISH AND CORRODE
3) CONDENSATION	SEE B RESULTS WHEN MATRIX FAILS TO CONFINE AMALGAM	SEE B C AND D UNDER FRACTURES	SEE MATRIX FAILURES UNDER B	EXCESS MERCURY IN AMALGAM MAY CAUSE EXPANSION AND PAIN TO OCCUR WITHIN 24 HOURS AFTER INSERTION	(SEE CAUSES OF MARGINAL DITCHING)	1 UNDERCONDENSED AMALGAM HAS HIGH RESIDUAL MERCURY CONTENT AND LOW STRENGTH 2 LAMINATION EFFECT IS PRODUCED WHEN CONDENSING EXCESSIVELY "DRY" SEGMENTS THIS RESULTS IN A LACK OF HOMOGENEITY			1-WET DENTAL INSTRUMENTS 2-SALIVA, BLOOD, ETC IN CAVITY WHEN CONDENSING ●	1 UNDERCONDENSED AMALGAM TEND TO TARNISH 2 LACK OF HOMOGENEITY INVITES GREATER TARNISH AND CORROSION
D MOISTURE CONTAMINATION	RESULTS WHEN AMALGAM BULGES FROM CAVITY AFTER DELAYED EXPANSION ●	1 DAMAGED CONTOUR ● 2 HIGH FLOW AND LOW STRENGTH INVITES DISTORTION AND WEAR OF CONTACT	TRAUMA OF EXPANDED AMALGAM AT GINGIVA ●	DELAYED EXPANSION PRODUCES INTRACORONAL STRAINS ●	FRACTURE OF MARGINAL AREAS FOLLOWING DELAYED EXPANSION ●	WILL REDUCE STRENGTH OF AMALGAM	WILL REDUCE STRENGTH OF AMALGAM	CAUSES LESS STRENGTH AND FLOW RESISTANCE	1 RESULT OF CONTAMINATION OF THE RESTORATIVE FIELD 2 SUGGESTS OVERALL FAULTY RESTORATIVE TECHNIC	1 DELAYED EXPANSION OF AMALGAM POCKETS OF HYDROGEN GAS IN RESTORATION 2 GAS PRESSURE OVERCOMES FLOW RESISTANCE ●	GREAT TENDENCY TO TARNISH AND CORRODE
E FINISH	RESTORATION NOT TRIMMED TO MARGINS	1 OVER CARVING AMALGAM 2 IMPROPER DESIGN OF CONTACT AND CONTOUR	1) FAILURE TO REMOVE OVERHANGS 2) LACK OF CONTOUR 3) TRAUMATIC OCCLUSION OF RESTORATION 4) IMPROPER OR INADEQUATE ANATOMICAL DESIGN	1) MAY BE DUE TO TRAUMA OF OVERHANGS, POOR CONTOUR OR OCCLUSAL DISHARMONY 2) OVERHEATING DURING FINISH	1) FRACTURES OF EXCESS AMALGAM IN GROOVES, ETC. 2) OVERCARVING 3) BURNISHING AT MARGINS	OVER CARVING OF ANATOMY IN RESTORATION	OVER CARVING OF ANATOMY IN RESTORATION		1- SEE UNDER MARGINAL OVERHANGS	1 DESTROYS POLISH OF RESTORATION 2 IMPOSSIBLE TO REPOLISH	1 UNPOLISHED RESTORATIONS 2 OVERHEATED DURING POLISH 3 COURSE GRAINED ALLOYS LEAVE ROUGHER SURFACE

ALL FAILURES MAY OCCUR ALSO WITH NON-ZINC ALLOYS EXCEPT IN AREAS MARKED WITH ●

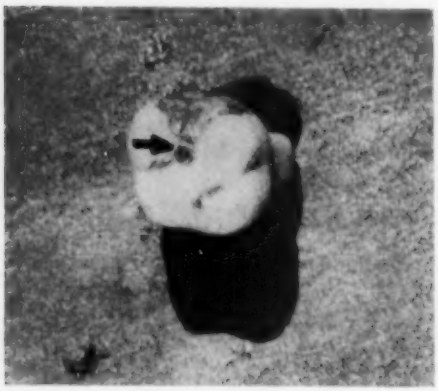


Fig. 2 • Failure of an amalgam due to inadequate occlusal extension of cavity preparation

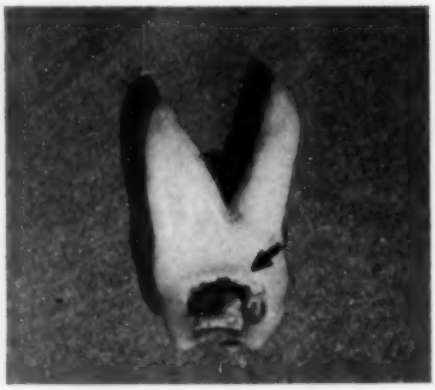


Fig. 3 • Typical failure due to inadequate extension of proximal walls, most frequent of all amalgam failures

on the occlusal portion for its stability, and when trauma separates the proximal from the occlusal surface, this retention insufficiency becomes apparent.[6]

It appears then that success with amalgam rests in part in the realization that the inherent weakness in the strength of the filling material must be compensated for in the preparation of its foundation in the tooth structure, and since amalgam itself is not normally considered capable of inhibiting caries recurrence (in adjacent regions) the preparation should include all potentially susceptible spots (Fig. 7). The dentist must be aware constantly that his efforts may be liquidated if a rigorous oral health regimen is not established. Briefly, the following principles should be adhered to (Fig. 8):

1. All grooves and fissures on the occlusal surface must be included, particularly if the dental caries index is high.

2. Proximal walls should be carried to a self-cleansing portion, buccally and lingually, without flares.

6. Markley, M. R. Restorations of silver amalgam. J.A.D.A. 43:133 Aug. 1951.

Fig. 4 • Left: Illustration of ditching of amalgam due to weakening of margin by beveling of preparation and deep carving of restoration. Right: Strong butt joint of amalgam and tooth resists marginal weakness. Note direction of cavity walls and shallowness of amalgam carving which are consistent with anatomic design of tooth

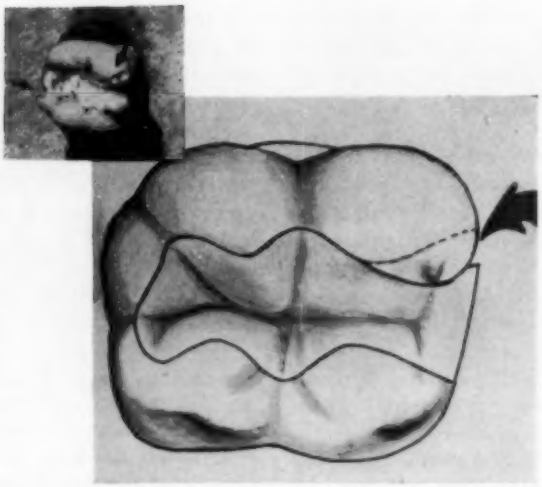


Fig. 5 • Ditching flaws due to flaring of cavity preparation at marginal ridge area

3. A sharp, right-angle butt joint should be established at the cavosurface margin.

4. Adequate depth and breadth to the preparation, without unnecessary extension, must be provided.

5. Definite, strong retention regions in the proximal walls must be established.

6. When restoring cusps an adequate bulk of amalgam that will replace lost tooth structure must be ensured (Fig. 9).

In using increased speeds every operator has become conscious of heat production during cavity preparation. Since postoperative pain can be allied to failure it is the dentist's obligation to make certain there is adequate cooling of tooth structure at all times during the rapid cutting procedure.[7] The use of adequate coolants not only controls a temperature rise but also acts to increase the rate of tooth removal on condition that excessive cutting pressure is not applied. A highly efficient method of cleaning the operative field and controlling heat production has been introduced by Thompson[8] in the washed field technic.

MATRIX

The design and relation of contacts, the anatomical design of the marginal ridge, the marginal continuity of restoration and tooth, and the re-establishment of contours all play vital roles in assuring that the tissues of the periodontium will return to and maintain a state of health. Mosteller[9] and Stibbs[10] have challenged the operative dentist to recognize and respect the relationship of his work to periodontal health. Each restorative dentist, whether he openly professes it or not, is practicing preventive periodontics with every successfully designed restoration.

The stepping stone to success in establishing proper contour and contact is the assurance that these physical shapes in a restoration can be attained with the ma-

7. Peyton, F. A., and Henry, E. E. Problems of cavity preparation with modern instruments. New York J. Den. 22:147 April 1952.

8. Thompson, E. O. Clinical applications of the washed field technic in dentistry. J.A.D.A. 51:703 Dec. 1955.

9. Mosteller, J. H. Relation between operative dentistry and periodontal disease. J.A.D.A. 47:6 July 1953.

10. Stibbs, G. D. Role of operative dentistry in the prevention of periodontal disease. J.A.D.A. 45:645 Dec. 1952.

trix applied. It is never safe to assume that the condensation of the soft plastic mass will push the matrix about, or stretch it, in order to distort it into the form desired.

Once the matrix design has met requirements satisfactorily, attention is directed to its stability. Instability of a matrix will not only result in a distorted restoration but will invite gross marginal excesses (Fig. 10), and an undercondensed, soft amalgam. The cervical excess provides a perpetual mechanical irritation to the periodontium; gradually and certainly these periodontal tissues will be destroyed in the vicinity of the trauma (Fig. 11). Contouring, wedging, stabilizing and establishing a proper contact are fundamental to the successful amalgam.[11] Every operator has recognized the ease of condensing amalgam to a Class I cavity. Pressure against unyielding walls makes for an ideal situation and permits thorough condensation and the development of a completely homogeneous restoration. The loss of natural walls in a cavity requires a substitute which must provide similar qualities. If a complete, effective condensation is attempted against a poorly stabilized matrix, "landslides" are inevitable. The result is a weakened restoration with gross cervical excesses. Too often a compromise with matrix instability is attempted with gentle tamping in condensation, and a soft amalgam, filled with voids, is the price of this maneuver (Fig. 12).

AMALGAM MANIPULATION

It has been stated[12] that more amalgam restorations fail from poor workmanship than from the use of poor alloys. Today this statement is more true than ever be-

11. Castaldi, C. R., and Phillips, R. W. Study of the proximal contour of Class II amalgam restorations using various matrix band technics. Presented before 33rd annual meeting, International Association for Dental Research, Chicago, March 18-20, 1955.

12. Tingley, H. E. Clinical use of amalgam. D. Items Interest 62:608 July 1940.

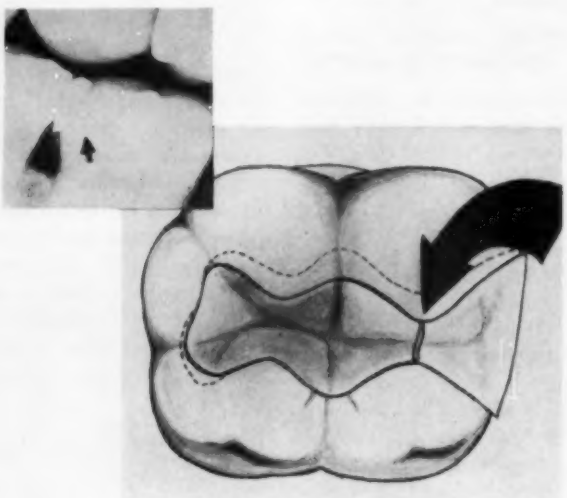


Fig. 6 • Isthmus fracture with complete detachment of proximal from occlusal portion of restoration. Inset shows caries beyond arrow. Extension of outline to dotted lines is not considered a substitute for strong proximal retention

Fig. 7 • Extension of proximal walls of the cavity preparation. Note that the occlusogingival design conforms to contour of adjoining tooth

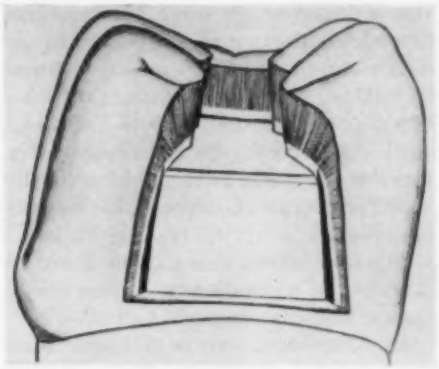


Fig. 8 • Class II preparation in a lower first molar. Note that proximal outline permits adequate extension of self-cleansing area in cervical third of tooth

fore. Research which developed specifications and technics of manipulation has provided acceptable materials and procedures. How this knowledge is used rests with each dentist, and with only the slightest effort he, or his assistant, can conform to proven detail for preparing and condensing the amalgam. Successful restorations are more apt to result when variables are kept under strict control. It is the basic principle of all manipulative procedures to provide the mold with a well prepared and well condensed amalgam, and its residual mercury content might be considered an appropriate measure of an operator's ability to produce such amalgam.

A serious loss of strength results when mercury in excess of 55 per cent remains in the restoration.[13] The clinical result of an increase in residual mercury is reduced crushing strength, increased flow, and increased susceptibility to tarnish and corrosion. Phillips[14-15] states that excess

13. Swartz, M. L., and Phillips, R. W. Residual mercury of amalgam restorations and its effects on compressive strength. Paper presented before 33rd annual meeting, International Association for Dental Research, March 18-20, 1955.

14. Phillips, R. W. Amalgam—its properties and manipulation. New York J. Den. 23:105 March 1953.

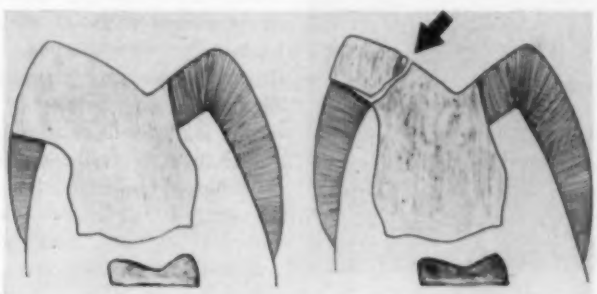


Fig. 9 • Illustration of the need for adequate cuspal amalgam to resist fracture in tooth structure

mercury used in the original mix unfortunately results in a higher percentage of mercury in the final restoration, and that no method of condensation can alter this effect. The correct ratio is obtained quickly and accurately from balances or scales if the ratio recommended by the manufacturer of the alloy in his instructions is used.

It is well known that mulling is a continuation of trituration, a process which gives added assurance that all alloy particles have been duly coated with mercury. Some prefer to do this manually; others prefer the amalgamator with or without pestle. Most operators today realize that palming is a poor practice, and may use a clean piece of rubber dam to minimize any chance of moisture contamination of the plastic amalgam. Frequently, following trituration, the pestle is removed from the capsule and trituration is repeated for 1 to 2 seconds. This procedure is helpful in mulling and cleaning the capsule of amalgam remnants. Amalgam which hardens in the capsule will contaminate future mixes,[16] and is frequently the cause of the hard islands of amalgam that pull out of the plastic mass while the filling is being carved. For this reason capsules should be checked carefully for cleanliness after each use.

Fig. 10 • Gross cervical overhang. There is adequate evidence here that no matrix was used. Calculus can be seen below the excess

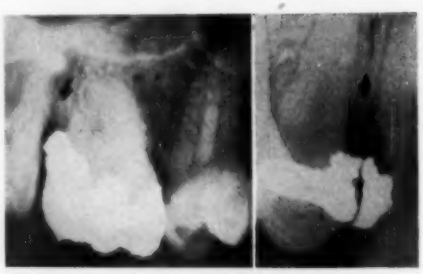


Fig. 11 • Roentgenographic evidence of restorative inadequacies and their effect on the periodontium. Note lack of contour, contact and confinement of restorations

CONDENSATION

The principal reasons for condensation are to reduce the residual mercury content and to ensure that amalgam reaches all parts of the preparation. An excess of mercury imparts many undesirable features in the amalgam if it is allowed to remain in the mass: it reduces its compressive strength and flow resistance; it retards the set, and it encourages tarnish and corrosion. It has already been stressed that freshly prepared amalgam has more desirable working properties, since the mercury has not had time to be trapped or combined with the newly crystallized mass. The effectiveness of its removal during condensing procedures is largely dependent on the use of an amalgam which is no more than four minutes old. It has been a well-recognized fact that prolonging plasticity by continuing to

15. Phillips, R. W., and Boyd, D. A. Importance of the mercury-alloy ratio to the amalgam filling. J.A.D.A. 24:451 April 1947.

16. Sweeney, J. T. Manipulation of amalgam to prevent distortion and corrosion. J.A.D.A. 31:375 March 1944.

Fig. 12 • Voids in proximal portion of an amalgam due to inadequate condensation. Caries recurrence at cervical margin suggests that undercondensation caused cavity to be incompletely filled

mull the amalgam beyond its normal initial setting time, or replasticizing it by adding mercury, will seriously reduce its strength. If a larger cavity demands that the working time of the amalgam exceeds 3 to 4 minutes, the use of multiple mixes will allow the operator to handle new plastic amalgam throughout the condensing procedure and ensure the building of a homogeneous restoration.

There are limits, however, to the amount of mercury which must be removed from the amalgam to assure that its properties will be optimal. Although it imparts certain undesirable properties to amalgam, mercury is also necessary to bind the mass together into a homogeneous form. Elimination of mercury by excessive squeezing of newly triturated mass may induce a laminated effect and seriously reduce the strength of the restoration. The end result, it appears, is similar to the working of a partially crystallized or "set" amalgam.

A greater percentage of mercury removal during restoration construction is accomplished by squeezing the freshly mixed amalgam. The critical reduction, however, to a point below 55 per cent is attained by conscientious packing. It does not appear necessary for the first portion of the amalgam being condensed to be mercury-rich in order to attain sufficient plasticity for marginal adaptation.[17] If a forceful and thorough technic is followed, adaptation will prove no problem to the operator.

The method of packing is an individual choice, since both manual and mechanical methods have certain distinct advantages and shortcomings. Regardless of method, much of the procedure in the condensation of gold foil is applicable also to the packing of amalgam. The thoroughness of condensation that can result from stepping and wedging will ensure an excellent adaptation and increased strength to the restoration. Sweeney[16] cautioned operators by saying that:

> Stepping with small pluggers or burnishing the material within the cavity is strongly condemned. Small pluggers merely push the amalgam from one place to another and condensation is not realized. The small pluggers push holes in the mass, which had previously been laid down, and their use tends to result in a weak restoration. In burnishing, the soft mate-

17. Swartz, M. L., and Phillips, R. W. Study of amalgam condensation procedures with emphasis on the residual mercury content of the increments. J. D. Res. 33:12 Feb. 1954.

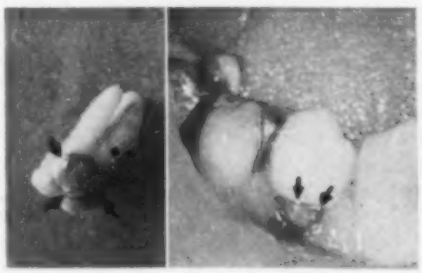


Fig. 13 • Amalgam blisters which were created by an accumulation of hydrogen gas under surface of restoration. Blister on left of inset was opened and found to be hollow

rial is pushed ahead of the burnisher, this weak amalgam depositing itself on the margins and in the sharp angles where the strongest alloy is desired.

Effective condensation can be achieved by using condensers which are shaped roughly to the outline of the tooth portion being restored. The packing motion, when performed manually, is most effective if the condenser is "rocked" under a steady, heavy thrust. The mercury-rich amalgam that works to the surface is removed quickly before it "seeps" back into the condensed mass. Light tamping, on the other hand, will move very little mercury to the surface.

Each operator who has employed mechanical condensation realizes that it can do much in assuring that an adequate packing force is being delivered against the mass. Ryge and others[18] demonstrated that mechanical methods of condensation generally cause the amalgam to harden sooner and have a slightly higher ultimate compressive strength than those amalgams which have been condensed by hand. It is interesting to note, however, that the strength of properly hand-condensed amalgam exceeds the requirement of the A.D.A. specifications. The principal value of mechanical condensing, it appears, lies in the assurance that there is some protection against a premature fracture of the restoration during the first few hours after insertion.

A word of caution against the careless use of the mechanical condenser is indicated here. Gold foil may resist the penetration of the condenser nib and will protect the fragile, brittle enamel walls, but amalgam in its plastic state is incapable of this, and the possibility of shattering the enamel walls can lead to flaws developing at enamel margins.

CONTAMINATION

Words have been spoken, written, read and forgotten on the problem of keeping oral fluids out of the prepared tooth structure and restoration; moreover, since the middle of the last century this problem has been gradually solved. Attention has been called to the deleterious effect that moisture, in any form, can have on the filling material—gold foil, amalgam or silicate cement—but the experience of 100 years in the practice of dentistry by five generations of dentists has failed to stimulate the profession into a complete recognition of the problem.

It was stated early in this presentation that the satisfaction of a well placed restoration is often measured in the early hours after its placement. Because failures cannot be seen, usually, within these early hours, the operator is prone to accept his efforts with a smug "well done." However, with time, and in the warm climate of the mouth, a contaminated amalgam will slowly undergo a metamorphosis. Gradually, a new chemical action takes place in the mass, in which hydrogen gas is formed.[19] Then expansion, followed by marginal flaws, tarnish, pitting, and corrosion, changes the whole appearance of a restoration that was once considered a "successful" restoration (Fig. 13).

The effect of moisture in zinc-containing amalgams is demonstrated in Figure 14. Amalgams contaminated with varying amounts of physiological saline solution were condensed into 4 by 8 mm. cylinders. Each of the four brands of alloys demonstrated excessive expansion within one month. The amount of saline and zinc in the amalgam specimens appeared to produce no perceptible differences in the amount of expansion.

The attention that has been given to moisture contamination of this nature has centered around its effect in producing delayed expansion. This is unfortunate because it fails to show the entire picture

18. Ryge, G., and others. Dental amalgam: the effect of mechanical condensation on some physical properties. J.A.D.A. 45:269 Sept. 1952.

19. Schoonover, I. C.; Souder, W., and Beall, J. R. Excessive expansion of dental amalgam. J.A.D.A. 29:1825 Oct. 1942.

of its dangers, and has, in recent years, given the profession a false sense of security. The amalgam of nonzinc alloys will not produce the delayed expansion that is inevitable in the zinc-containing amalgams, but this is its sole advantage. No one yet has been able to demonstrate that palm moisture or saliva is considered a desirable ingredient of dental amalgam. To the contrary, moisture in any form will weaken amalgam (Fig. 15), reduce its desirable qualities, and place it in the category of a temporary cement. Figure 1 reveals that nonzinc alloys will not provide protection against the development of more numerous and probably more serious flaws or failures that can occur in amalgam restorations. If moisture is allowed to contaminate the plastic amalgam of the zinc or nonzinc variety, it is quite proper to assume that the entire restorative technic is faulty also.

In a gun factory a great steel bar was suspended vertically by a delicate chain. Nearby, a bottle cork was suspended by a silk thread. Could the cork set the steel bar in motion?

The cork was swung gently against the steel bar: the bar remained motionless. Then the cork was swung repeatedly. In ten minutes the bar gave evidence of

Fig. 14 • Delayed expansion in amalgam. Four brands of alloy containing 0.45 to 1.0 per cent zinc were contaminated with varying amounts of physiological saline solution. A, B, C, and D were controls. All contaminated specimens produced gross expansion within one month

Fig. 15 • Soft, powdery amalgam which results from inadequate mercury removal during condensation or follows moisture contamination

feeling "uncomfortable"; a "nervous chill" ran over it. Ten minutes later the chill was followed by vibration. At the end of half an hour the great bar was swinging like a pendulum.

Our predecessors and our modern teachers have probably felt like the cork as they have tried to show the value and need for using a rubber dam and preventing the contamination of the restorative field. Slowly, very slowly, the pendulum is beginning to swing, and there is heartening evidence everywhere that both dentists and the public have been educated to the value of the rubber dam in stimulating better dental treatment. In the past four years there has been nearly a 40 per cent increase in yardage sales of this item by one manufacturer alone,[20] and this is a sound indication that the efforts of Barnum, Black, Woodbury, Sweeney, Metcalf, Jones, and others have gradually borne fruit.

FINISH OF RESTORATION

Many flaws which gradually become apparent in amalgam may be attributed to methods employed in finishing restorations after their placement. All dentists

20. Personal communication from W. P. Keith, Hygienic Dental Rubber Co., April 27, 1956.

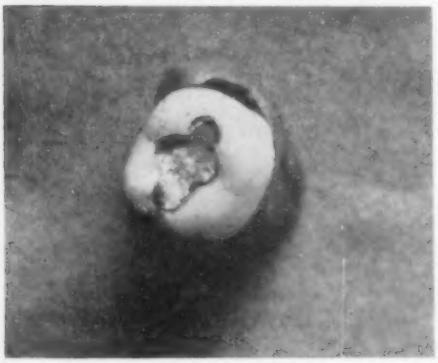


Fig. 16 • Ditching due to fractures of untrimmed excess over margins, or of weakened edges over beveled cavosurface margins.

realize that some of these flaws eventually become failures. Caries recurrence may result under the shelter of marginal excess which could have been dressed to the margins in a cautious finishing procedure. Many flakes and spur-like overhangs fracture from the restoration sooner or later and leave susceptible crevices in vulnerable areas of the tooth surface. The results of these marginal amalgam fractures, and those which culminate from cavosurface beveling, often are erroneously mistaken as being the results of abnormal amalgam expansion (Fig. 16).

Larger fractures will lead to failures in amalgam where the zealous operator overcarves a restoration in an attempt to replace normal, anatomic features in the restoration. Unless adequate resistance form compensates for this weakening, the trauma of mastication will destroy a beautifully carved but impractical restoration.

The problem of tarnish and corrosion of a restoration is usually one that is controllable, on condition that care is taken in the preparation, placement and finish of the amalgam. If a cautious, thorough trituration is accomplished and this is followed by an effective condensation, the resulting amalgam is assured of being a homogeneous mass. Uncoated alloy particles, cracks or voids, and a mercury-rich, soft amalgam will lead to a restoration that resists polish and readily tarnishes or corrodes. Amalgams which may have been contaminated in placement will present a well polished surface in the early days after placement. However, this surface eventually changes and an irreparable pitting by corrosion results. Its polish can never be regained.

It has been noted that the well prepared and placed amalgam can resist tarnish efficiently if it is polished as soon as it is hard enough and then kept polished (Fig. 17). Mitchell and others[21] have warned against injudicious polishing. When such procedures produce temperatures above 65° C. (140° F.), mercury is released from the amalgam to produce weakened or defective regions. If these result at margins they may ultimately invite caries recurrence.

SUMMARY

Amalgam restorations are capable of developing countless minor defects, and when these become failures may lead to

21. Mitchell, J. A.; Dickson, G., and Schoonover, I. C. X-ray diffraction studies of mercury diffusion and surface stability of dental amalgam. Paper presented before 33rd annual meeting, International Association for Dental Research, Chicago, March 18-20, 1955.

Fig. 17 • Resistance to tarnish and corrosion is greater with well-condensed, uncontaminated and well-polished amalgam restorations.

the eventual loss of teeth. Other failures seem to be born shortly after the placement of the restoration, having been created by gross shortcomings in the preparation of the cavity or by misjudgment in its indication for use. It is unfair to direct criticism of these failures to amalgam without awareness of its intrinsic shortcomings or inadequacies. Instead, it is obligatory to aim evaluation of amalgam to the dentist's skill in attaining the maximum results from its numerous potentials. Its success or failure rests in the hands of professional experts.

Evaluation of analgesic combinations for dental use

Harvey A. Strand, D.D.S.; Fred Henninger, D.D.S., and James M. Dille, Ph.D., M.D., Seattle

The evaluation of analgesic effectiveness of a drug or a combination of drugs may be approached in either of two ways. The evaluation may be made on a clinical basis using patients who are suffering from pain and are in need of relief by medication. This approach has been used and evaluated by Beecher[1] and has certain advantages in that it represents an evaluation of the analgesic under the ultimate conditions of use. In the second approach the evaluation of the analgesic may be made on normal volunteer subjects who are subjected to experimentally induced pain of various kinds. Harris and Worley[2] have reviewed the advantages of this approach. It avoids the desire on the part of a patient in pain to secure relief from the pain; it eliminates the agents which relieve pain by an action peripherally at the source of pain; it avoids the concomitant effects of the central depression produced by many analgesics of the narcotic type; and it has the advantage of quantitative control over the degree of pain stimulus.

The experiments and results reported here make use of the second method and are concerned with the evaluation and comparison of aspirin and codeine with certain combinations of these two agents with phenobarbital and hyoscyamine. Pain stimuli were applied by the method of Goetzl, Burrill and Ivy[3] with certain technical modifications which represent improvements in that they rule out the emotional response to pain.

EXPERIMENTAL METHODS

General Procedure • Volunteer subjects were used in all these experiments. Each individual was subjected to the experi-

This work was partially supported by a research grant from the A. H. Robins Co., Inc., Richmond, Va.

From the School of Dentistry and department of pharmacology, School of Medicine, University of Washington.

1. Beecher, H. K. Experimental pharmacology and measurement of subjective response. Science 116:157 Aug. 15, 1952.

2. Harris, S. C., and Worley, R. C. Evaluation of a new analgesic. J. Appl. Physiol. 7:84 July 1954.

3. Goetzl, F. R.; Burrill, D. Y., and Ivy, A. C. Critical analysis of algesimetric methods with a suggestion for a useful procedure. Quart. Bull., Northwest. Univ. M. School 17:280, 1943.

mental procedure described hereafter with five days between each test. Pain was applied by means of an electrical impulse from a Grass stimulator to the upper right central incisor through a platinum electrode cemented in place with a zinc oxyphosphate cement and isolated from saliva by a finger cot applied about the cervical line of the tooth. An indifferent electrode was attached to the left wrist.

Certain precautions were taken in order to secure basal and uniform conditions. The subject was isolated in a soundproof room in a supine position on a hospital bed with the head and back inclined at an angle of about 30 degrees. The polygraph and other equipment were in an adjoining room. During the course of the procedure, which extended over four hours, phonograph music was played at a low level. The subjects were not permitted to smoke during the course of the experiment. All tests of pain threshold were signaled to the patient before the beginning of the test. The subject signaled the arrival of the pain threshold by pressing a switch held in the right hand which automatically turned off the stimulus.

During the course of the experiment, polygraphic tracings were made of heart rate, respiration rate, the galvanic skin reaction and face temperature. Of these measurements, the galvanic skin reaction proved to be most responsive. The other measurements were modified but to a lesser degree than the galvanic skin reaction.

All medications were administered by the double blind technic in identical capsules, and the routine was maintained rigidly in each of the four-hour experiments.

The Stimulator • A Model S4A Grass stimulator was used. The frequency was set at 1,000 square waves per second; this frequency was maintained in all of the experiments. The voltage could be varied smoothly from 0 to 24 volts at which point an automatic cutoff was provided to prevent possible damage to the tooth.

The Grass stimulator was controlled by a cycling device of special design. This comprised a voltage control operated by means of a constant speed motor arranged so that the increase in voltage to the stimulating electrode was maintained at a constant rate for one minute. A calibrated dial connected to this motor made it possible to read the stimulating voltage at any time.

Through a system of relays it was possible for the subject to stop the motor at any time and thus end the stimulation. At this point the operator could then read the threshold voltage from the calibrated dial. A resetting device was provided to restore the cycling motor to its original position.

This method of control has several advantages: (1) it increases the voltage at a uniform and constant rate independent of the operator; (2) it permits immediate reading of the threshold stimulus, and (3) it gives the subject a feeling of confidence because he can immediately cut off the painful stimulus without fear of its overshooting because of failure of the operator.

Polygraph Equipment • The polygraph pick-up transducers and amplifiers were especially designed. They fed impulses to a Grass electroencephalograph. The following recordings were made: heart rate through the electroencephalograph, respiratory rate, face temperature from a thermistor applied to the cheek and the galvanic skin reaction measured from the first and second fingers of the left hand.

It was expected that the polygraph would show noticeable changes in response to the painful stimuli and would thus give an objective index which could be correlated with the subjective evaluation of the pain by the subject. This was indeed the case in the first trials; how-

ever, it was soon found that after a short period of training and particularly if care was taken not to surprise the subject with an unexpected painful stimulus, responses could be maintained at a relatively unchanging level. Thus, it became evident that there was a factor in the evaluation of analgesics which heretofore may have been overlooked; this is the emotional response of the subject to the anticipation of pain as well as the pain itself. The polygraph made it possible to record these factors and thus to provide a situation where the pain was uncomplicated by an emotional response to it.

Medications Evaluated • The following agents were prepared in capsules in such a way that there were no identifying features:

1. Placebo—powdered starch.
2. Aspirin—0.3 Gm. mixed with powdered starch to fill out the capsule.
3. Mixture (Phenaphen)—consisting of the following:
   a. Phenacetin, 194.0 mg.
   b. Acetylsalicylic acid, 162.0 mg.
   c. Phenobarbital, 16.2 mg.
   d. Hyoscyamine sulfate, 0.031 mg.
4. Codeine phosphate—½ grain (30 mg.) tablets placed in capsule with powdered starch to fill out the capsule.
5. Mixture with codeine (Phenaphen with Codeine Phosphate ½ gr. "Phenaphen No. 3")—the formula as given for the mixture plus ½ grain (30 mg.) of codeine phosphate.

A master schedule was prepared for all the subjects, and the order in which the agents were administered was randomized. A double blind technic was used in which neither the subject nor the experimenter knew which agent was administered.

Procedure for Testing • A total of 11 men and 3 women subjects was used. All volunteered for the series of experiments. The ages varied from 25 to 40. A medical history of each subject was taken, and he was particularly questioned regarding a past history of illnesses and general reaction to medications, including any allergic sensitivities. A general physical examination was given to rule out any gross physical finding which might have led to aberrant results.

The entire procedure was then explained to the subject, and he was shown the apparatus and told in considerable detail how it functioned and its purposes. Several days later a dry run was carried out. This extended over the same period, four hours, as each experimental run, but was interrupted from time to time to explain the procedure and to make certain that the subject was completely familiar with his part in the experiment. Usually, in this first run, the polygraph records indicated a feeling of anxiety or uneasiness on the part of the subject, but these disappeared as the subject became acclimated to the experimental conditions. No data are presented from these dry runs, and they may be generally regarded as practice sessions for both the subject and the experimenter.

Of the 14 subjects who began the program, four were not used in the final compilation. Three of these did not complete the series and one showed an unexplained resistance to all of the medications. It was expected that placebo reactors might be found among the subjects but such was not the case.

Experiments began either at 9:00 A.M. or 1:00 P.M. This means that the medication was given while food was still in the stomach. Subjects were told to eat a light breakfast or lunch, but this represents an uncontrolled variable. No food was taken during the experiments.

During the experimental period a rigid procedure was followed. The placing of the electrodes and polygraph pickups required approximately 15 to 30 minutes. After this, the subject was allowed to lie quietly in the soundproof room for approximately 15 minutes. At the end of this time, the subject was informed

Table 1 • Summary of results of pain threshold determinations of ten subjects receiving at different times the analgesics indicated

Subject	Time in minutes							
	30	60	90	120	150	180	210	240
				Placebo				
1	0.0	−0.6	0.2	−1.0	−0.6	0.2	0.4	0.0
2	0.0	0.6	−0.4	0.2	0.6	0.0	−0.6	0.0
3	0.0	0.2	−0.6	−0.4	−0.2	0.0	−0.8	−1.2
4	0.0	0.3	−0.1	0.3	−0.3	0.1	0.3	0.0
5	0.0	0.2	0.0	0.4	0.2	0.4	0.6	0.0
6	0.0	−0.2	0.2	0.4	0.2	0.0	0.4	0.0
7	0.0	0.5	1.4	0.8	0.4	0.6	0.2	0.8
8	0.0	0.4	0.6	0.0	0.8	0.2	0.4	0.4
9	0.0	−0.3	0.1	−0.3	0.5	−0.1	−0.3	0.1
10	0.0	0.2	−0.2	0.2	0.0	0.4	0.2	0.0
Mean	0.0	0.13	0.12	0.06	0.16	0.18	0.08	0.01
				Aspirin				
1	0.0	0.4	0.8	1.4	1.6	1.4	1.8	1.4
2	0.0	0.2	0.6	0.8	0.8	1.2	1.0	0.8
3	0.0	0.6	0.8	1.2	1.4	1.6	1.4	1.2
4	0.0	0.0	0.4	0.6	0.6	1.0	0.8	1.0
5	0.0	0.6	0.8	1.2	1.0	1.0	0.8	0.6
6	0.0	0.4	0.8	0.6	1.2	1.4	1.2	1.2
7	0.0	0.6	0.8	1.1	1.3	1.6	1.1	1.3
8	0.0	0.2	0.6	1.0	1.0	0.6	1.3	1.0
9	0.0	0.4	0.0	0.4	0.6	0.8	0.4	0.2
10	0.0	0.3	0.3	0.7	1.1	0.9	0.7	0.9
Mean	0.0	0.37	0.59	0.9	1.06	1.15	1.05	0.96
				Mixture				
1	0.0	−0.2	0.6	1.2	1.4	1.6	1.8	1.6
2	0.0	0.6	1.0	1.2	1.4	1.6	2.0	2.2
3	0.0	0.3	0.5	0.5	1.3	1.5	1.7	1.5
4	0.0	0.4	0.8	1.2	1.6	1.6	1.8	1.4
5	0.0	0.4	0.6	1.0	1.4	1.8	1.6	2.0
6	0.0	0.4	1.0	1.4	2.2	2.0	2.4	2.2
7	0.0	0.1	0.3	0.8	1.4	1.2	2.0	2.4
8	0.0	0.4	1.0	1.4	1.6	1.4	1.8	1.6
9	0.0	0.2	0.4	0.8	0.6	1.2	1.0	1.2
10	0.0	0.4	0.6	0.6	1.0	1.2	0.6	0.8
Mean	0.0	0.3	0.68	1.01	1.39	1.51	1.67	1.69
				Codeine				
1	0.0	0.7	2.2	3.0	2.8	2.6	3.0	2.6
2	0.0	1.2	2.0	2.6	3.0	2.6	2.6	2.0
3	0.0	0.6	1.0	1.4	1.6	1.8	1.6	1.8
4	0.0	0.6	1.4	1.8	2.0	2.2	2.0	1.8
5	0.0	1.2	1.6	2.0	2.2	2.4	1.8	1.6
6	0.0	0.6	1.2	2.0	2.4	2.6	2.4	2.2
7	0.0	0.6	1.4	1.8	2.6	2.2	2.8	2.4
8	0.0	0.4	1.2	1.0	1.2	1.8	0.8	0.8
9	0.0	0.2	0.2	1.6	2.0	2.4	2.2	2.6
10	0.0	0.8	1.2	2.0	2.2	2.4	1.8	1.6
Mean	0.0	0.69	1.34	1.92	2.2	2.3	2.1	1.94

Table 1 • Continued

Subject	Time in minutes							
	30	60	90	120	150	180	210	240
	Mixture with codeine							
1	0.0	0.4	1.2	1.6	2.0	2.6	2.8	2.2
2	0.0	0.6	1.2	1.6	2.0	2.8	3.6	3.8
3	0.0	0.7	1.1	1.3	1.3	1.7	2.1	2.3
4	0.0	0.2	0.8	1.2	1.6	2.2	2.0	2.2
5	0.0	1.6	2.0	1.8	2.2	2.0	2.2	2.0
6	0.0	0.4	1.0	1.8	1.9	2.8	3.2	3.2
7	0.0	1.4	1.7	2.3	3.1	3.7	3.7	3.3
8	0.0	0.6	1.6	1.8	2.0	2.4	2.6	3.2
9	0.0	0.2	1.0	1.2	2.0	2.0	2.4	2.6
10	0.0	1.2	1.4	2.0	2.4	2.4	2.6	2.4
Mean	0.0	0.73	1.30	1.66	2.05	2.46	2.72	2.72

through an intercom that the experiment would begin and that he would receive the first stimulus. The subject was informed that the stimulus was about to begin. Within five to ten seconds the cycling device was turned on and the first threshold measurement taken. The measurement was repeated every five or ten minutes for a half hour, after which the experimenter entered the room and administered the capsule with a half of a glass of water. During the remainder of the experimental procedure, which covered three and a half hours, the experimenter made tests of the threshold at five to ten minute intervals, always signaling the subject beforehand. These measurements were tabulated for subsequent statistical evaluation.

EXPERIMENTAL RESULTS

At the end of the four hour period of the experiment, the determinations of pain threshold had been accumulated in tabular form. The total number of such evaluations in one four-hour period usually ranged from 40 to 60. In order to reduce this mass of data to manageable form, an arithmetic mean was determined for each half hour of the experimental period. The mean for this first half hour, the control period, was then considered to be zero. Departures from this base either by a rise or fall of the threshold are given in Table 1. Thus, all the values were brought into a basic relationship.

The actual threshold voltage for the first half hour of the experiment (the control) was found to vary considerably between one subject and another and even between different times with the same subject. This variation is shown in Table 2. It is believed that the reason for the different thresholds between experiments and individuals is due to different resistances of the tooth in different individuals and to a different placement of the stimulating electrode in the same individual at different times. This problem has been considered by Harris and Brandel[4] and Harris and Blockus.[5]

An analysis of variance on the original data yielded the results shown in Table 3. A Bartlett's test for homogeneity of variance yielded a chi square far short of significance, and it may be concluded that the significant "F" ratios represent a difference in the means. Both the drug

4. Harris, S. C., and Brandel, N. E. Tooth pulp as an algesimetry site. J. D. Res. 29:68 Feb. 1950.

5. Harris, S. C., and Blockus, L. E. Reliability and validity of tooth pulp algesimetry. J. Pharmacol. & Exper. Therap. 104:135 Feb. 1952.

Table 2 • Thresholds in volts obtained during the control periods. These absolute values show the variation between individuals and between different times for the same individual presumably due to variations in enamel resistance

Subject	Voltage during control period for:				
	Placebo	Aspirin	Mixture	Codeine	Mixture with codeine
1	14.6	9.6	6.2	5.4	9.8
2	11.0	13.0	11.6	12.0	15.0
3	12.4	15.4	12.3	14.4	11.5
4	6.5	6.8	4.4	4.2	6.6
5	10.6	13.0	13.6	14.0	10.6
6	4.2	4.4	3.8	4.8	3.6
7	6.0	5.3	10.6	5.8	5.1
8	12.0	8.6	11.0	11.2	10.8
9	6.7	6.2	5.6	7.2	3.6
10	5.0	6.5	6.2	5.6	7.2

effects and the time at which the measurement was taken yield a highly significant "F". The crucial interaction is the drug versus time interaction, which is also highly significant. This allows a generalization from this sample to the population from which it was drawn and shows that the difference between drugs is a function of the time at which it is measured. Since these differences in the forms of the plotted curves are significant, they may be compared at the various time intervals.

The drug versus subject interaction shows that the effect of the drug is significantly related to which subject is being tested, and, conversely, that the variability between subjects depends on which drug is administered. Since this represents an additional source of variance between drugs, the drug versus subject variance was used to test significance of the drug variance. The time versus subject interaction was significant at the 0.05 level, and is interpreted in the same manner as the drug versus subject interaction. The failure of the between-subjects variance to reach significance shows that there was little between-subject variation, and since the drug versus subject and the time versus subject interactions are significant, it is apparent that what differences there are between the subjects are related to the drug and the time variables.

Comparisons of the drugs by the "t" test of significance were calculated for placebo versus aspirin, aspirin versus the mixture, and codeine versus the mixture with codeine. Table 4 summarizes these results. The aspirin was superior to the placebos 60 minutes after medication. The mixture was superior to aspirin 120 minutes after medication. The mixture with codeine was superior to codeine 180 minutes after medication, and these differences continued for the remainder of the experimental period.

DISCUSSION

Several significant observations which are applicable to the study of analgesics in

Table 3 • Summary of analysis of variance of postmedication deviations from premedication thresholds

Source	Sum of squares	Degrees of freedom	Variance estimate	f ratio
Drug	152.49	4	38.12	60.51*
Time	51.90	6	8.65	72.08*
Subjects	13.79	9	1.53	1.82*
Drug x time	26.28	24	1.10	13.75*
Drug x subjects	22.72	36	0.63	7.88*
Time x subjects	6.58	54	0.12	1.50†
Drug x time x subjects	18.07	216	0.08	
Total		349		

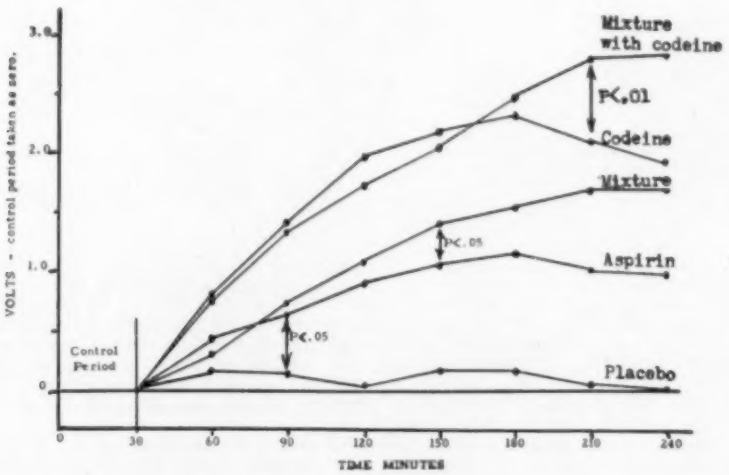
* = P<0.001
† = P<0.05

Table 4 • Major comparisons between drugs. Summary of the "t"-test of significance of postmedication deviations from premedication thresholds

Comparison	Time of first significant difference	t	Degrees of freedom	Probability
Placebo vs. aspirin	90	3.13	9	$P<.05$
Aspirin vs. mixture	150	2.54	9	$P<.05$
Codeine vs. mixture with codeine	210	3.26	9	$P<.01$

general were made in the course of this research. It is significant that the responses to pain observed in the polygraphic tracings in the first sessions disappeared as the subject became experienced and comfortable in the experimental situation. Although no objective measurements are presented in this paper, since this is not a direct concern with analgesic evaluation, it is evident that at least part of the physiological response to pain is the result of surprise and the resulting emotional state. Unquestionably the presence of such a situation acts as a complicating factor in any evaluation of pain thresholds and the effect of analgesics upon them. Any true evaluation of analgesic effect should be estimated as has been done in this study after the emotional factors have been eliminated.

Another significant observation is that what is found in a comparison between two analgesics depends on the time during the experiment at which the comparison is made. For example, truly valid evidence that aspirin had a greater analgesic effect than a placebo did not appear until 60 minutes after the administration. This delay in manifestation of a difference may have been due to the rate of absorption from the gastrointestinal tract, but it may also mean that although aspirin was already exerting its analgesic action this analgesic action was not of a



Pain thresholds at half hour intervals. Each point represents the average of ten subjects. The drug indicated was administered orally at the end of the 30 minute control period. Vertical arrows indicate point at which a significant difference first appeared between curves indicated

sufficient degree to have a statistically valid difference from the control placebo. In a like manner, the distinction between the mixture with codeine and codeine alone was not evident until more than three hours after administration.

The evidence under the conditions of the experimental procedure indicated that the addition of potentiating agents, phenobarbital and hyoscyamine, effectively increased the efficacy of the basic analgesic agents, either aspirin or codeine.

Of some interest is the status of the pain threshold at the termination of the four hour experimental period. It would have been desirable to continue the experiment until the pain threshold returned to normal, but this was not possible with human subjects. There is an indication that the thresholds for aspirin and codeine were diminishing toward the original level at the end of four hours but the curves for the mixture and the mixture with codeine remained sustained (see illustration). This may have been due to the presence of phenobarbital, which is a long-acting barbiturate and could be expected to exert its potentiating properties in such a way as to sustain the analgesic effects of either aspirin or codeine.

SUMMARY

Because of careful orientation and preparation of the subject, the factors of emotional response to experimentally induced pain were eliminated in regard to measurement by polygraphic means, so that pain thresholds could be measured without the complications of emotional response.

In order to determine the statistically valid differences between two analgesic agents, it is necessary to make comparisons at intervals throughout the course of an experiment, since significant differences do not always appear immediately.

Phenobarbital and hyoscyamine are effective synergistic agents in potentiating the analgesic effect of aspirin and codeine.

Problem of Science • The problem of science is to discover once and for all the laws whereby individual events in nature may be traced back to general laws and in turn be determined from these laws. The search for the general laws is the task of practical science. Theoretical science, however, seeks to discover the unknown origins of the processes by considering their observable effects, seeking to comprehend them by application of the principle of cause and effect.

Scientists are led to and entitled to such practice through the axiom that every change in nature must have its own adequate cause.

The proximate causes, which scientists attribute to normal phenomena, can well be invariable or variable; in the later case, the same principle compels science to seek other antecedent causes for the modification, until it eventually arrives at ultimate causes operating in accordance with an immutable law which consequently at all times produces the same effect under the same external circumstances.

The ultimate aim of pure science, therefore, is to find the final unalterable causes of the processes of nature. *H. L. F. von Helmholtz. The Conversion of Energy.*

Pathologic studies in man after prolonged ingestion of fluoride in drinking water I. Necropsy findings in a community with a water level of 2.5 ppm

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The value of artificial fluoridation of drinking water in the prevention of dental caries has been accepted generally. Furthermore, much evidence has been accumulated to indicate that 1 ppm is a safe level that permits beneficial effect and yet avoids possible toxic cumulative effect. This evidence in man is of clinical, statistical and roentgenographic character.[1-8]

The present study was instituted to furnish information concerning possible pathologic effects in residents of an area with a high natural level of fluoride.

MATERIAL AND METHODS

The series consists of 904 necropsies performed in Colorado Springs between 1947 and 1953 by the senior author (E.F.G.), or by resident physicians in pathology training under his direct supervision. Colorado Springs has a natural fluoride level of approximately 2.5 ppm. During the years that the necropsies were performed, the senior author had no special interest in fluorides. Although this might be looked on as desirable in that the necropsies were performed without prejudice in this controversial field, it had the disadvantage that no special attention was given to the bones, a known storehouse for fluorides. Thus, this study was complemented in Part II by another undertaken between 1955 and 1957 with detailed examination of bones. The Colorado Springs necropsy protocols were reviewed by the senior author and the diagnoses classified according to: (1) the major cause of death; (2) contributing causes unrelated to the major cause; (3) incidental pathologic condition.

It was hoped that such classification and subsequent analyses might not only indicate whether there was evidence of

From the National Institute of Dental Research, Bethesda, Md., and the pathology service of St. Francis and Glockner-Penrose Hospitals, Colorado Springs, Colo.

1. McClure, F. J. Nondental physiologic effects of trace quantities of fluorine. Dental caries and fluorine, a symposium. F. F. Moulton, ed., A.A.A.S., Washington, D. C. 1946, p. 74-91.

2. Leone, N. C., and others. Medical aspects of excessive fluoride in a water supply. Pub. Health Rep. 69:925 Oct. 1954.

3. Hagan, T. L.; Pasternack, M., and Scholz, G. C. Waterborne fluorides and mortality. Pub. Health Rep. 69:450 May 1954.

4. Leone, N. C., and others. A roentgenologic study of a human population exposed to high-fluoride domestic water; a ten-year study. Am. J. Roentg. 74:874 Nov. 1955.

5. Machle, W.; Scott, E. W., and Largent, E. J. Absorption and excretion of fluorides; normal fluoride balance. J. Indust. Hyg. 24:199 Sept. 1942.

6. Machle, W., and Largent, E. J. Absorption and excretion of fluoride; metabolism at high levels of intake. J. Indust. Hyg. 25:112 March 1943.

7. Hilleboe, H. E., and others. History of the Newburgh-Kingston caries fluorine study: final report. J.A.D.A. 52:291 March 1956.

8. Hodge, H. C. Concentration of fluorides in drinking water to give the point of minimum caries with maximum safety. J.A.D.A. 40:436 April 1950.

serious cumulative toxic effects but also whether incidental pathologic processes impairing health were possibly related to the ingestion of fluorides. The material was classified according to residence history. The results were then tabulated and the figures analyzed statistically.

In most instances it was easy to determine the major cause of death from the necropsy protocol, which included a description of the findings on gross and microscopic examination, an abstract of the clinical history and a clinicopathologic summary. In relatively few instances, however, serious coexistent disease required evaluation of all clinical and pathologic features including the character of death. When the decision was made in such instances, the coexistent disease was then listed among the unrelated contributing causes.

Certain other criteria were established arbitrarily and were applied equally to all protocols in each residency group. In a consideration of all deaths caused by new growths with metastases present at necropsy, contributing causes such as the following were considered to be related to the new growth: obstructive conditions from metastases such as pyonephrosis from ureteral involvement due to prostatic cancer and postoperative cardiac failure after surgery for treatment of cancer when the patient had advanced cardiac disease.

Postoperative embolic deaths after cancer surgery were also considered related to the new growth, whether or not metastases were present. If no metastases were found at necropsy and death followed surgery and was due to cardiac failure from advanced cardiac disease, the latter was listed as an unrelated contributing cause and placed in a separate table. Pneumonia was found as a terminal event in many instances where there had been new growths and cardiovascular disease. It was considered a contributing cause related to the major cause unless some special feature was present; that is, lobar distribution of pneumonia and the major disease apparently controlled.

In the group with cardiovascular diseases, whenever a second vascular condition contributed, it might be considered related under certain conditions. Thus, cerebral arteriosclerosis with thrombosis and encephalomalacia accompanying advanced coronary arterial disease would be evaluated as a related cardiovascular disease if the coronary process was considered the major cause of death.

When the necropsy is conducted in a thorough manner, the protocol will almost always contain a number of diagnoses of incidental pathologic conditions in elderly persons. In an attempt to determine the possible effect of fluoride, the necropsy protocols were analyzed first for every condition which might be related. Consideration was given to the possible dangers claimed by opponents of fluoridation.[9] Thus, diseases of the thyroid, kidney, liver and pancreas were listed and other specific conditions such as peptic ulcer, gall stones and urinary tract stones. It should be emphasized again that the diseases found in the thyroid, liver, kidney, pancreas, stomach and duodenum were in mild, healing or focal form and often were detected only on microscopic examination. Each patient for whom there was a diagnosis listed in the table of incidental pathologic findings was also affected by one of the major causes of death. For some patients there were, in addition, one or more of the diagnoses listed in the table of contributing causes. Reference has already been made to the fact that in routine necropsies special attention is not given to the bones, and that this study is complemented by another in progress (Part II) in which detailed examination of that system was carried out.

Colorado Springs is a place where el-

9. Exner, F. B., and Waldbott, G. L. American fluoridation experiment; ed. by James Rorty, Devin Adair Co., New York, 1957.

derly people from other parts of the country retire, particularly the middle west. In the residence analyses, several groups were considered: a group which had resided in Colorado Springs for less than five years; a second group which had resided in Colorado Springs from 5 to 20 years, and a third group which had resided there for more than 20 years. A fourth group was found also in which the duration of residence in Colorado Springs was unknown.

Since the main goal of this study was to determine cumulative toxic effects over long periods, if present, newborn infants and children under ten years of age were eliminated, and the final analyses consisted of 728 necropsy protocols. There were 188 persons (25.8 per cent) who had lived in Colorado Springs for less than five years; 130 (17.9 per cent) from 5 to 20 years; and 334 (45.9 per cent) who had resided in Colorado Springs 20 years and more. In the fourth group in which the duration of residence in Colorado Springs was unknown, there were 76 persons or 10.4 per cent (Tables 1 and 2).

Table 1 • Distribution of cases by sex and duration of residence

Sex	Residence in Colorado Springs: Years				
	20+	5-20	<5	Unknown	Sum
Male	174	75	117	46	412
Female	160	55	71	30	316
Total	334	130	188	76	728
	Per cent distribution				
Male	42.2	18.2	28.4	11.2	100.0
Female	50.6	17.4	22.5	9.5	100.0
Total	45.9	17.9	25.8	10.4	100.0

RESULTS

Pathologic Features • More detailed analyses were made of the "new growth" and cardiovascular categories after tabulation since they were the most frequent among the major causes of death as is apparent in Tables 3 and 4. Of the males in all four groups, bronchogenic and gastrointestinal cancer were most common. In the females, gastrointestinal, uterine and breast cancer were most frequent in all four groups.

Before continuing with this detailed analysis, it should be stressed that the statistical interpretation of any differences in disease incidence between residency groups will be discussed under "statistical features."

Cancer of the kidney and bones was as uncommon in the group with residency in Colorado Springs for over 20 years as in the other three categories: there were 3 instances of renal, and 3 of bone cancer among the 334 persons in the over 20 years' residency group. Among the 188 persons in the less than five years' duration residency group, there were 2 instances of renal and 2 of bone cancer. There were no instances of primary hepatic cancer in this group, and two in the over 20 years' residency series. Occasionally, a benign new growth resulted in death. For example, the postoperative cardiac failure or embolism was sometimes responsible for death after hysterectomy for fibromyomata or lobectomy for bronchial adenoma.

In the cardiovascular system of all groups, the most common condition causing death was coronary arterial disease. The clinicopathologic features in 100 consecutive fatal instances in this series were reported elsewhere by the senior author.[10] Cerebral vascular, hypertensive cardiorenal and aortic disease with rupture were fairly frequent causes of death in all four groups. The coronary arterial disease

10. Geever, E. F. Fatal coronary heart disease: clinicopathologic patterns and other features in 100 consecutive cases. A.M.A. Arch. Int. Med. 93:658 May 1954.

deaths were 42, 28, 31 and 9 respectively in the over 20 years, 5 to 20, less than 5 years, and unknown, residency groups. Hypertensive cardiorenal disease occurred in 16, 9, 5 and 4 instances respectively. The cerebral vascular diseases were 23, 2, 6 and 1 respectively, and in the over 20 years' duration residency group of 23, 17 of them occurred in women.

In the major causes of death from conditions in the urogenital tract, apart from neoplasms, the men in the over 20 years' duration residency group were affected in 10 instances, 8 from prostatic hypertrophy. The enlarged prostate usually caused a train of obstructive and inflammatory changes in the urinary bladder, ureters and kidneys. Pyelonephritis and pyonephrosis as a result of the prostatic condition often resulted in death due to uremia. There were two independent renal conditions as major causes of death in this over 20 years' duration residency group of 10: one was chronic glomerulonephritis with death at 51 years of age, and one with chronic pyelonephritis and

Table 2 • Distribution of cases by age, sex, and duration of residence

Age at death: years	Residence in Colorado Springs					Per cent distribution				
	Years									
	20+	5-20	<5	Unknown	Sum	20+	5-20	<5	Unknown	Sum
10-19	—	3	4	1	8	—	2.3	2.1	1.3	1.1
20-29	10	1	8	6	25	3.0	0.8	4.3	7.9	3.4
30-39	7	3	11	8	29	2.1	2.3	5.9	10.5	4.0
40-49	27	15	27	14	83	8.1	11.5	14.4	18.4	11.4
50-59	55	20	43	13	131	16.5	15.4	22.9	17.1	18.0
60-69	70	34	49	15	168	21.0	26.2	26.1	19.7	23.1
70-79	116	39	35	16	206	34.7	30.0	18.6	21.1	28.3
80+	49	15	11	3	78	14.7	11.5	5.9	3.9	10.7
Sum	334	130	188	76	728	100.0	100.0	100.0	100.0	100.0
					Male					
10-19	—	—	3	1	4	—	—	2.6	2.2	1.0
20-29	5	—	4	3	12	2.9	—	3.4	6.5	2.9
30-39	3	2	6	5	16	1.7	2.7	5.1	10.9	3.9
40-49	15	10	15	10	50	8.6	13.3	12.8	21.7	12.1
50-59	28	11	31	6	76	16.1	14.7	26.5	13.0	18.4
60-69	42	23	32	11	108	24.1	30.7	27.4	23.9	26.2
70-79	55	22	22	9	108	31.6	29.3	18.8	19.6	26.2
80+	26	7	4	1	38	14.9	9.3	3.4	2.2	9.2
Sum	174	75	117	46	412	100.0	100.0	100.0	100.0	100.0
					Female					
10-19	—	3	1	—	4	—	5.5	1.4	—	1.3
20-29	5	1	4	3	13	3.1	1.8	5.6	10.0	4.1
30-39	4	1	5	3	13	2.5	1.8	7.0	10.0	4.1
40-49	12	5	12	4	33	7.5	9.1	16.9	13.3	10.4
50-59	27	9	12	7	55	16.9	16.4	16.9	23.3	17.4
60-69	28	11	17	4	60	17.5	20.0	23.9	13.3	19.0
70-79	61	17	13	7	98	38.1	30.9	18.3	23.3	31.0
80+	23	8	7	2	40	14.4	14.5	9.9	6.7	12.7
Sum	160	55	71	30	316	100.0	100.0	100.0	100.0	100.0

Table 3 • Major cause of death by length of residence in Colorado Springs

Cause	Total				Male				Female			
	20+	5-20	<5	Unknown	20+	5-20	<5	Unknown	20+	5-20	<5	Unknown
New growth	111	26	50	23	52	12	28	10	59	14	22	13
Accident	14	7	7	7	7	3	7	7	7	4	0	—
Leukemia	3	2	3	1	2	1	2	—	1	1	1	1
Anemia	3	—	2	—	3	—	1	—	—	—	1	—
T. B.	11	5	16	4	5	4	11	4	6	1	5	—
Other	16	8	17	2	4	2	7	—	12	6	10	2
Other diseases by systems:												
Cardiovascular	109	55	60	27	60	37	40	19	49	18	20	8
Respiratory	20	8	11	4	12	5	9	1	8	3	2	3
Digestive tract	26	8	8	3	16	6	5	2	10	2	3	1
Liver	4	6	—	0	3	4	—	—	1	2	—	0
Nervous system	2	1	7	3	—	—	2	2	2	1	5	1
Urogential tract	15	4	7	2	10	1	5	1	5	3	2	1
Total	334	130	188	76	174	75	117	46	160	55	71	30

death at 74 years of age. There were 5 deaths from urogenital causes in the men in the under 5 years' residency group: 3 were due to prostatic disease and 2 to primary renal disease; that is, one with glomerulonephritis and death at 52 years of age, the other with congenital polycystic kidneys and death at the age of 45.

Among the women, urogenital tract disease caused five deaths in the over 20 years' duration residency group; 1 from arteriolosclerotic nephrosclerosis plus pyelonephritis at 72 years of age, and 4 with pyelonephritis at ages 62, 71, 73 and 82 years. This is in contrast with two deaths in the under 5 years' exposed group, one with chronic glomerulonephritis with death at 18 years of age and the other with pyelonephritis and death occurring at 65 years.

Table 5 indicates the incidental pathologic conditions found. Those placed under the heading of thyroid included nodular goiter, fetal or other type adenomas, and miscellaneous pathologic

Table 4 • Major cause of death by length of residence in Colorado Springs. (Per cent distribution)

Cause	Total				Male				Female			
	20+	5-20	<5	Unk.	20+	5-20	<5	Unk.	20+	5-20	<5	Unk.
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New growth	33.2	20.0	26.6	30.3	29.9	16.0	23.9	21.7	36.9	25.5	31.0	43.4
Accident	4.2	5.4	3.7	9.2	4.0	4.0	6.0	15.2	4.4	7.3	—	—
Leukemia	0.9	1.5	1.6	1.3	1.1	1.3	1.7	—	0.6	1.8	1.4	3.3
Anemia	0.9	—	1.1	—	1.7	—	0.9	—	—	—	1.4	—
T. B.	3.3	3.8	8.5	5.3	2.9	5.3	9.4	8.7	3.8	1.8	7.0	—
Other	4.8	6.2	9.0	2.6	2.3	2.7	6.0	—	7.5	10.9	14.1	6.7
Other diseases by symptoms:												
Cardiovascular	32.6	42.3	31.9	35.5	34.5	49.3	34.2	41.3	30.6	32.7	28.2	26.8
Respiratory	6.0	6.2	5.9	5.3	6.9	6.7	7.7	2.2	5.0	5.5	2.8	10.0
Digestive tract	7.8	6.2	4.3	3.9	9.2	8.0	4.3	4.3	6.3	3.6	4.2	3.3
Liver	1.2	4.6	—	—	1.7	5.3	—	—	0.6	3.6	—	—
Nervous system	0.6	0.8	3.7	3.9	—	—	1.7	4.3	1.3	1.8	7.0	3.3
Urogenital tract	4.5	3.1	3.7	2.6	5.7	1.3	4.3	2.2	3.1	5.5	2.0	3.3

Table 5 • Incidental pathologic findings at necropsy

	20+		5-20 Years		<5 Years		Unknown	
	Male	Female	Male	Female	Male	Female	Male	Female
Thyroid disease	19	60	12	16	12	24	12	13
Gall stones	20	42	11	16	7	11	2	5
Renal disease	77	72	32	21	46	29	15	15
Urinary tract stones	7	5	1	2	4	1	2	1
Hepatic disease	31	27	11	9	29	6	7	8
Peptic ulcer	7	8	5	0	4	3	3	2
Diabetes mellitus*	1	3	1	0	0	1	0	1
Pancreatitis	7	7	1	2	3	0	1	1
Total	169	224	74	66	105	75	42	46

*Clinical diagnosis.

changes such as fibrosis, cystic or calcific changes.

The incidental renal pathologic conditions included vascular changes; that is, arterial changes or arteriolosclerosis or both, tubular degeneration, inflammatory processes, adenomas and cysts. Among the hepatic incidental diagnosis were cirrhosis, noncirrhotic inflammatory changes, adenomas or hemangiomas, cysts and fatty metamorphosis. The other headings are self-explanatory.

Statistical Features • Many statisticians have demonstrated that necropsy material can supply only limited information and has certain inherent biases. However, the reporting on the source material being considered here is uniform because the necropsies were performed by one pathologist or by resident physicians in training under his direction. He was responsible for reviewing all necropsies which he did not perform himself. Secondly, all 728 necropsies that were done in the period under consideration were studied in this report.

This report deals essentially with a trichotomy of the total series and is based on an attribute (residence history) which is independent of the inherent weaknesses of necropsy series. There is no reason to believe that either group within the series was favored or penalized since the pathologist was unaware of the residence history when the necropsies were performed. He was also unaware of the ultimate use of the protocols in this report. It is, therefore, believed that the comparisons between groups within the series are valid.

Age, sex and residence characteristics are given in Tables 1 and 2. Of the 334 instances in the over 20 years' duration residency group, further analysis revealed that 234 had been residents of Colorado Springs for more than 30 years and 149 had been residents for more than 40 years. From Table 2 it is apparent that 49.4 per cent of the persons in the over 20 years' residency group were 70 years of age and older, 41.5 per cent in the 5 to 20 years' residency group, 24.5 per cent in the under 5 years', and 25.0 per cent in the unknown residency groups. Thus comparison between groups must be made with this fact in mind.

Tables 3 and 4 list the data with respect to the major cause of death. One out of every four necropsy protocols showed the major cause of death to be neoplasm. There were 210 such protocols in 728, or 28.8 per cent. Diseases of the cardiovascular system comprised 34.5 per cent. New growths were more frequent in females than in males; that is, 34.2 per cent and 24.8 per cent. The difference of 9.4 percentage points is statistically significant. The explanation is probably related to the difference in the age distribution among males and females.

There were 35.4 per cent of the men who were 70 years and over, whereas 43.7 per cent of the women were 70 years of age and over. In Table 4 it can be seen that in the 5 to 20 years' duration residency group, the total of the deaths from new growths and cardiovascular conditions was 62.3 per cent, approximately the same as the long term total for the two groups of diseases; that is, 65.8 per cent for the over 20 years' duration residency group. However, the total for the new growths was 20.0 per cent or 13.2 percentage points below the 33.2 per cent of the over 20 years' duration residency group. The difference is statistically significant.

Similarly, the difference of 9.7 percentage points between the 42.3 per cent deaths of the 5 to 20 years' residency group from diseases of the cardiovascular system and the 32.6 per cent figure in the long term group; that is, the over 20 years' duration residency group, is statistically significant.

The explanation for these differences probably lies in the difference in the age distributions and the fact that there were fewer persons in the medium duration residency group; that is, 26 out of 130 as compared with 111 out of 334. Obviously, it would be as unreasonable to attribute an apparent beneficial effect to fluoride in reducing deaths from cardiovascular conditions in the long term residency group as it would to attribute to it a deleterious effect in elevating deaths from new growths.

The same reasoning is applicable, based on differences in age distribution and small numbers, in explanation of the differences noted on detailed analysis of disease in the previous section on pathologic features. It is also apparent that in the medium duration residency group (5 to 20 years), the percentage of deaths from new growths was less than was the percentage in the under 5 years' duration group. Similarly, the medium duration group had a higher percentage of deaths from cardiovascular diseases than did the under 5 years' residency group.

There was relatively little difference in the percentages of new growth and cardiovascular deaths between the long term (over 20 years) and short term (less than five years) groups.

The less than five years' residency group revealed a high percentage of deaths from tuberculosis, but this was not unexpected because Colorado Springs at the time the necropsies were performed was still a tuberculosis treatment center.

Table 6 lists the contributing causes of death. Six patients in the over 20 years' residency group had two unrelated contributing causes, 40 patients had one, and 288 had none. Six patients were found in the under five years' residency group with two contributing causes, 19 had one contributing cause, and the remaining 163 had none. In the other two residency categories, no patient had more than one contributing cause. Cardiovascular diseases predominated or were as frequent as any other disease in any of the four residency groups. There was no greater incidence of cardiovascular disease in the 5 to 20 years' group than in the over 20 years' duration residency group to confirm that shown in the major causes of death in Table 4. The pancreatitis noted in the over 20 years' duration residency group will be referred to later.

In the over 20 years' duration residency group, no incidental pathologic conditions were found in 93 patients (27.8 per cent) in the categories listed in Table 5; 129 (38.6 per cent) had one and 112 (33.5 per cent) had two or more. In the 5 to 20 years' duration residency group, 39 patients (30.0 per cent) had none, 49 (37.6 per cent) had one, and in 42 (32.3 per cent) two or more incidental pathologic conditions were noted. In the less than 5 years' residency group, 66 persons (35.1 per cent) had none, 75 (39.9 per cent) had one, and 47 (25.0 per cent) had two or more conditions diagnosed. In the fourth group, resi-

Table 6 • Total contributing causes unrelated to the major cause

	20+		5-20 Years		<5 Years		Unknown	
	Male	Female	Male	Female	Male	Female	Male	Female
New growth	1	0	0	0	2	0	1	2
Accident	0	0	0	0	0	0	0	0
Leukemia	0	0	0	0	0	0	0	0
Anemia	0	0	0	0	0	0	0	0
T. B.	1	1	0	0	1	1	0	0
Others:								
Thyroid	0	2	0	0	0	0	0	1
Pancreatitis	4	0	0	0	0	0	0	0
Diabetes m.*	2	1	0	0	0	3	1	0
Miscellaneous	1	0	1	0	1	4	0	0
Other diseases by systems:								
Cardiovascular	14	9	5	3	6	4	1	2
Respiratory	3	1	2	0	2	2	0	0
Digestive	2	2	1	1	2	0	0	0
Liver	0	2	0	0	2	0	0	1
Nervous system	1	1	0	0	0	0	0	0
Urogenital	1	3	0	0	1	0	1	2
Total	30	22	9	4	17	14	4	8

*Clinical diagnosis.

dency unknown, 29 patients (38.2 per cent) had none, 21 (27.6 per cent) had one, and in 26 (34.2 per cent) two or more incidental pathologic changes were noted.

The differences between residency groups as a whole were not significant statistically. However, a statistically significant difference was observed in the percentage in whom gall stones was noted between the over 20 years' duration residency group and the group residing in Colorado Springs less than 5 years. Gall stones occurred in 62 instances, 20 men and 42 women, for a total of 18.6 per cent in the former, and 18 instances, 7 men and 11 women or 9.6 per cent in the latter or short-term residency group. This difference can be explained on the basis of the difference in median ages in the two groups: in the long term; that is, over 20 years' duration residency group, the median age of the men was 68 years, the women 70 years. In the less than 5 years' duration residency group, the median age was 59 years for the men and 61 for the women.

Mentzer,[11] in 633 necropsies in Rochester, Minn., found gall stones in 22 per cent of the adults over 21 years of age as against the 18.6 per cent quoted for the long-term residents in the present study. Analysis of our series by decades and sex reveals that 52.5 per cent of the women in the over 20 years' duration residency group died at the age of 70 or older. Gall stones were found at necropsy in 22 of these women. There were 14 instances of gall stones among 61 women between 70 and 79 years of age, and eight among 23 women 80 years of age and over. The corresponding percentages were 23.0 and 34.8 per cent. This could be compared with figures of 26.8 per cent and 50 per cent from Ludlow's series in Cleveland.[12] He found the two values mentioned in women in the decades 71 to 80 and 81 to 90 years, respectively. Both cities, Rochester, Minn. and Cleveland, had little or no fluoride in their drinking water at the time of the studies reported by Mentzer and Ludlow.

Chemical analyses of gall stones were

11. Mentzer, S. H. Clinical and pathologic study of cholecystitis and cholelithiasis. Surg. Gynec. Obst. 42:782 June 1926.

12. Ludlow, A. I. Autopsy incidence of cholelithiasis. Am. J. M. Sc. 193:481 April 1937.

reported from communities, including Colorado Springs, Colo., with elevated fluoride levels in the drinking water. Zipkin, Lee, and Leone[13] found no significant increase in fluoride in these calculi.

It is generally accepted that pancreatitis is often associated with gall bladder disease and calculi. In analyzing the instances of pancreatitis in the over 20 years' duration residency series, either as a major or contributing cause of death, or as an incidental finding, 12 out of 21 instances of pancreatitis were accompanied by gall stones or cholecystitis or both. Thus, the apparent increase in pancreatitis as seen in Tables 5 and 6 can be related directly to the gall stones and to the older median age of the long term (over 20 years' duration residency) group.

In conclusion, the over-all comparison of incidental findings in the various residency groups revealed a surprising degree of uniformity. Usually, in a table with so many comparisons possible, many more striking differences might be expected.

SUMMARY

1. Necropsies were performed or supervised by one of us (E.F.G.) on 904 patients between 1947 and 1953 in Colorado Springs, Colo. This is a community in which there was a natural fluoride level of 2.5 ppm in the drinking water during that period.

2. The results of re-examination of the protocols and classification of the data into the major cause of death, contributing causes and incidental pathologic conditions were tabulated.

3. The residence histories after eliminating deaths among the newborn and among children under 10 years of age, revealed four groups: 334 persons who had resided in Colorado Springs for more than 20 years; 130 who had resided there from 5 to 20 years; 188 under 5 years, and 76 in whom the residence history was incomplete. This study of the pathologic findings was thus based on 728 necropsies.

4. Comparative statistical analyses of the pathologic findings revealed no significant differences which could be related to prolonged residence in this environment.

13. Zipkin, I.; Lee, W. A., and Leone, N. C. Fluoride content of urinary and biliary calculi. Proc. Soc. Exper. Biol. and Med. In press.

Freedom for Science • We are at the very beginning of time for the human race. It is not unreasonable that we grapple with problems. There are tens of thousands of years in the future. Our responsibility is to do what we can, learn what we can, improve the solutions and pass them on. It is our responsibility to leave the men of the future a free hand. In the impetuous youth of humanity, we can make grave errors that can stunt our growth for a long time. This we will do if we say we have the answers now, when we are so young and ignorant; if we suppress all discussion, all criticism, saying, "This is it, boys, man is saved!" and thus doom man for a long time to the chains of authority, confined to the limits of our present imagination. It has been done so many times before. *R. P. Feynman. The Value of Science. Science 123:307 Feb. 24, 1956.*

Microbiologic hazards of local dental anesthesia
I. A state-wide survey of procedures in common practice

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A state-wide survey of the dentists in active practice was conducted[1] in order to ascertain the sterilization and injection technics in common use for local dental anesthesia.

The study was initiated to provide baseline information for follow-up laboratory and clinical studies of procedures used in local injection of anesthetics, through which microbiologic infections might be incurred.

PROCEDURE

A questionnaire, designed to elicit specific information as to the injection technics used for local dental anesthesia, a covering letter requesting cooperation in the study, and a stamped, addressed return envelope were mailed to 1,272 practicing dentists. The mailing list of these dentists represented the complete Addressograph mailing file of actively practicing dentists in the state studied, as supplied by a dental supply company. The dentists were requested to return the questionnaire, unsigned.

The questionnaire shown herein lists certain of the questions asked; inquiries not pertinent to this study have been omitted. (The questions omitted include inquiries as to the relative use of various brands of topical and oral anesthetics and surface antiseptics, and those questions pertinent to anesthetic injections by needle and syringe only.)

Data listing the number of dentists in active practice in the state surveyed, the dental schools from which these dentists graduated, and the year of their graduation, were compiled from the *1957 American Dental Association Directory.*

The professional background data of the 1,654 dentists in active practice in the state are presented in Table 1. The category "active practice" was used here to designate general practitioners, oral surgeons, orthodontists, pedodontists, periodontists, prosthodontists, and oral pathologists. It did not include public health dentists, dentists full time on staffs of dental schools, dentists serving internship or residency at accredited hospitals,

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1. Zinner, D. D., and Streitfeld, M. M. Bacteriologic dangers of local dental anesthesia. Presented before thirty-fifth general meeting, International Association for Dental Research, Atlantic City, N. J., March 23, 1957.

dentists full time with public or industrial programs, dentists full time with dental societies, dentists full time with commercial agencies in dental field, retired dentists, or dentists engaged in other professions or occupations.

It can be seen from Table 1 that the dentists had graduated from 81 dental schools at locations throughout the United States. Inspection of the table reveals the relative distribution among northern, southern, eastern, mid-western and western areas. Heavy representation is noted from schools in the midwest, and in states along the length of the Atlantic Coast.

Table 1 also indicates that 32.4 per cent of the dentists graduated from dental school in 1925 or earlier, 36.2 per cent graduated between the years 1926-1945, and 31.4 per cent completed dental school during the post-World War II years of 1946-1957.

Completed questionnaires were returned by 666 dentists; these represent 52.4 per cent of the 1,272 dentists surveyed. Unanswered questionnaires were returned by an additional 11 dentists; of these, one indicated that he had retired recently, and the remaining ten indicated that they were practicing a dental specialty not requiring local anesthesia.

DENTAL QUESTIONNAIRE

(1) What method of sterilization do you use for:

(Check)	Needles	Carpule exterior	Syringe
a. None			
b. Alcohol wiping			
c. Alcohol soaking			
d. Autoclave			
e. Hot air sterilizer			
f. Boiling			
g. Flaming			
h. Cold sterilization			
i. Other (please designate)			

(2) Do you, as a matter of routine, use cartridges* for oral injection of local anesthetics?
(Check) Yes_____ No_____ Comment:

(3) Do you, as a matter of routine, mix your own local anesthetic solutions?
(Check) Yes_____ No_____ Comment:

(4) Do you, as a matter of routine, use topical anesthetics prior to injection of local oral anesthetic?
(Check) Yes_____ No_____ Comment:

(5) Do you, as a matter of routine, use topical antiseptics prior to local injection of oral anesthetic?
(Check) Yes_____ No_____ Comment:

(6) Do you use the same anesthesia cartridge* on more than one patient, if an adequate amount of anesthetic remains in the cartridge* after using once?
(Check) Yes_____ No_____ Occasionally_____

(7) Do you ever use the same anesthesia cartridge* for more than one injection in the same patient?
(Check) Yes_____ No_____

(8) Do you use slow (approx. 1 cc. per min.)_____or rapid (approx. 2 cc. per 15 sec.)_____injection technique?

(9) Do you use the same needle for more than one local injection on the same patient?
(Check) Yes_____ No_____

(10) What is the *average* amount of local anesthesia used *per injection*:
½ cc._____ 1 cc._____
1.5 cc._____ 2 cc._____ (Total cartridge*)

*The term "carpule," the trade name of Cook-Waite Labs., Inc., New York, for an anesthetic cartridge, was used in the actual questionnaire.

Table 1 • A tabulation of the dental schools from which dentists in active practice (in the state surveyed) graduated, and listing of the number of dentists graduating within particular time periods

Dental school or college	Number of dentists graduating within the years of:						
	1900 and earlier	1901-1925	1926-1940	1941-1945	1946-1950	1951 and later	Total
*Atlanta-Southern, Ga.	1	30					31
*Atlanta-Southern, Ga.		53	124	57			234
Baltimore Coll. Dent. Surg., Md.	1	22	21	12	4	19	78
*U. Maryland, Md.		12			1	2	15
U. Buffalo, N. Y.	1	4	3	2	1	2	13
*Chicago Coll. Dent. Surg., Ill.		27	10	3	3	4	47
Columbia U. Sch. Dent. and Oral. Su. N. Y.		1	10	3		1	15
Georgetown U., Wash. D. C.		8	2	7	2	4	23
Howard U., Wash., D. C.		3	3	6	3	8	23
U. Illinois, Ill.		6	4	2	4	3	19
*Indiana Dent. Coll., Ind.		14	1				15
Indiana U., Ind.		6	6	7	7	7	33
U. Iowa, Iowa	1	5	7	1	4	1	19
U. Louisville, Ky.		3	7	10	8	7	35
Loyola U., La.			7	8	7	11	33
Marquette U., Wis.		7		2	2	7	18
Meharry Med. Coll. Sch. Dent., Tenn.		9	7	2	3	3	24
U. Michigan, Mich.	2	28	7	8	4	10	59
U. Minnesota, Minn.		5	5	1	1	5	17
Northwestern U., Ill.	2	35	23	20	18	15	113
*New York Coll. Dent., N. Y.	2	17	1		1	1	22
New York U., Coll. Dent., N. Y.		1	11	8	7	11	38
Ohio State U., Ohio		3	16	10	3	16	48
U. Penn. Sch. Dent., Pa.		23	11	6	4	13	57
U. Pittsburgh Sch. Dent., Pa		18	14	5	6	6	49
*Royal Coll., Toronto		12		1			13
St. Louis U., Sch. Dent., Mo.		6	6	2	5	7	26
*Southern Dent. Coll., Ga.	2	33			1		38
Temple U., Sch. Dent., Pa.		5	9	3	3	11	31
U. Tennessee Coll. Dent., Tenn.		1	7	7	15	18	48
*Tufts Coll., Dent. Sch., Mass.		6	4	4		4	18
*Vanderbilt U., Sch. Dent., Tenn.	5	23	3				31
Medical Coll., Virginia, Va.		2	4	7	4	3	20
Washington U., Sch. Dent., Mo.		3	7	2		8	20
Western Reserve U., Ohio	1	5	9	6	5	6	32
Emory U., Sch. Dent., Ga.			1	13	51	97	162
†36 additional schools, each graduating 1-5 dentists	11	35	6	4	5	14	75
‡ 9 additional schools, each graduating 6-10 dentists	2	25	17	3		14	61
Total number of dentists in the state surveyed	31	504	367	232	181	339	1,654
Per cent of dentists graduating within each time period	1.9	30.5	22.2	14.0	10.9	20.5	——

*Asterisk represents schools no longer in existence, or merged with other dental schools; there are 43 schools in this category, of the 81 schools listed.

†Seventeen schools each contributed one dentist: Central Coll. Dentistry,* Ind.; Colorado Coll. Dentistry,* Col.; Columbian Dental Coll.,* Ill.; Columbian U. Dental Dept.,* Wash., D. C.; U. Denver Sch. Dentistry,* Col.; Drake U. Coll. Dentistry,* Iowa; International Coll. Dental Surgery,* Ill.; Marion-Sims Coll. Medicine Dental Dept.,* Mo.; McGill U. Fac. Dentistry, Montreal; Milwaukee Medical Coll. Dental Dept.,* Minn.; U. Nebraska Coll. Dentistry, Neb.; New Orleans Dental Coll.,* La.; Ohio Medical U. Coll. Dentistry,* Ohio; Texas Dental Coll.,* Texas; Western Dental Coll.,* Mo.; U. Texas Sch. Dentistry, Texas; Atlanta Coll. Physicians and Surgeons,* Ga. Eight schools each contributed two dentists: Boston Dental Coll.,* Mass.; Coll. Physicians and Surgeons, Calif.; Coll. Jersey City Dept. Dentistry,* N. J.; Kansas City Dental Coll.,* Mo.; Medico-Chirurgical Coll. of Philadelphia,* Pa.; Miami Dental Coll.,* Ohio; Pennsylvania Coll. Dental Surgery,* Pa.; Starling-Ohio Medical Coll. Dept. Dentistry,* Ohio. Four schools each contributed three dentists: Creighton U. Coll. Dentistry, Neb.; Detroit Coll. Med.,* Mich.; U. So. Calif. Sch. Dentistry, Calif.; and the U. North Carolina Sch. Dentistry, N. C. Five schools each contributed four dentists: Cincinnati Coll. Dental Surgery,* Ohio; Louisville Coll. Dentistry,* Ky.; U. Memphis Coll. Dental Surgery,* Tenn.; Philadelphia Dental Coll.,* Pa.; and George Washington U. Dental Dept.,* Wash., D. C. Two schools each contributed five dentists: U. Kansas City Sch. Dentistry, Kansas City-Western Dental Coll., Mo.; Baylor U. Coll. Dentistry, Texas.

‡Four schools each contributed six dentists: Coll. Dental and Oral Surgery,* N. Y.; U. Detroit Sch. Dentistry, Mich.; Harvard U. Dental Sch.,* Mass.; Tulane U. Sch. Dentistry,* La. Four schools each contributed seven dentists: Kansas City-Western Dental Coll., Mo.; North Pacific Coll. of Oregon Sch. Dentistry,* Ore.; Loyola U. Sch. Dentistry, Chicago Coll. Dental Surgery, Ill.; U. Alabama Sch. Dentistry, Ala. One school contributed nine dentists: Ohio Coll. Dental Surgery, U. Cincinnati, Ohio.

Table 2 • Dentists indicating routine use of prepared anesthetic cartridges, or personally compounded local anesthetic solutions

Replies	Anesthetic cartridges		Personally compounded anesthetic solutions	
	No.	Per cent	No.	Per cent
Yes	654	98.2	1	0.2
Occasionally	2	0.3	2	0.3
No	8	1.2	656	98.5
No answer	2	0.3	7	1.1
Totals	666	—	666	—

In the 666 completed survey questionnaires, a wide variety of sterilization procedures were indicated as being used for dental needles, syringes and anesthetic cartridges. The number of dentists "sterilizing" needles and syringes by boiling was approximately 46 to 49 per cent, by cold "sterilization" 28 to 30 per cent, by autoclaving 28 to 32 per cent; a number of other methods (that is, alcohol wipe, alcohol soak, hot air, flaming, and others) were also indicated as being routinely used for sterilization. A similar wide selection of methods was indicated as in use for routine sterilization of cartridge exteriors; the larger categories listed were: none (14.4 per cent), alcohol soak (18.2 per cent), alcohol wipe (20.1 per cent), and cold "sterilization" (28.4 per cent).

Table 2 shows that over 98 per cent of the 666 dentists who answered the questionnaires indicated that they routinely used anesthetic cartridges for oral injection of local anesthetics. Only 0.2 to 0.5 per cent of dentists replied that they routinely mixed their own anesthetic solutions.

In answer to the question, "Do you ever use the same anesthetic cartridge for more than one injection in the same patient?", approximately 88 per cent of the dentists' replies were in the affirmative (Table 3). Another of the questions asked was, "Do you use the same anesthetic cartridge on more than one patient, if an adequate amount remains in the cartridge after it has been used?". Table 3 indicates that 8 per cent of the dentists who returned completed questionnaires answered, "Yes," and 23.4 per cent answered, "Occasionally." Thus, 31.4 per cent of the dentists said that they did, at least on occasion, use the same cartridge on more than one patient.

Further baseline information requested in the questionnaire included queries as to the average amount of local dental anesthetic solution used per injection, and the usual speed of injection of local anesthetic. Table 4 lists 25.1 per cent of the dentists replying as indicating their use of 1 cc. of anesthetic, 34.2 per cent the use of 1.55 cc., and 39.5 per cent the use of 2 cc. Table 5 tabulates the responses reporting speed of injection, and shows that 74.6 per cent of the dentists report a slow (approximately 1 cc. per minute) technic, and 22.7 per cent use a rapid (approximately 2 cc. of anesthetic per 15 seconds) injection technic.

Table 6 records the responses to the question, "Do you, as a matter of routine, use topical antiseptics prior to local injection of oral anesthetic?". "No" was answered by 47.6 per cent of the dentists

Table 3 • Dentists indicating their use of single anesthetic cartridges for multiple injections, either in one, or more than one patient

Replies	Multiple injections in same patient:			Injections in more than one patient:		
	Dentists			Dentists		
	Number	Per cent		Number	Per cent	
Yes	587	88.1	88.7	53	8.0	31.4
Occasionally	4	0.6		156	23.4	
No	70	10.5		456	68.5	
No answer	5	0.8		1	0.2	
Totals	666	—		666	—	

Table 4 • Responses listing average amount of local anesthetic used per injection

Amount of anesthetic	Number of answers	Per cent of 666 dentists
½ cc.	22	3.3
Between ½ & 1 cc.	4	0.6
1 cc.	167	25.1
Between 1 & 1½ cc.	2	0.3
1½ cc.	228	34.2
Between 1½ & 2 cc.	12	1.8
2 cc.	263	39.5
Total	698*	—

*Thirty-two dentists listed more than one quantity of anesthetic as being used routinely.

returning survey forms; an additional 1.7 per cent indicated that they occasionally employed topical antiseptics (Table 6). Approximately one half of the classifiable returns thereby indicated that they did not use topical antiseptics routinely.

The percentage of correlation between the use of topical anesthetics and antiseptics has also been tabulated in Table 6; this correlation was made because a few of the surface anesthetics in common use may contain antibacterial agents. Of the dentists who replied to the questions as to their use of topical antiseptics and anesthetics, 9.9 per cent indicated that they used neither topical anesthetics nor antiseptics, and an additional 2 per cent indicated their occasional use of surface anesthetic agents, in the absence of topical antiseptics. Thus, a minimum of 11.9 per cent of the dentists answering the survey do not attempt any surface disinfection routinely, whereas only 42.5 per cent answered that they do use surface antiseptics routinely prior to local injection of dental anesthetic.

DISCUSSION

A survey questionnaire developed to determine dental injection procedures in common use was completed and returned by 666 of the 1,272 dentists surveyed; thus, data were available for 52.4 per cent of the dentists surveyed, and 40.3 per cent of the 1,654 dentists in active practice in the state surveyed, as listed in the *American Dental Association Directory*. These high sampling percentages indicate that the completed questionnaires present a significant representative sampling of procedures in common use among the dentists surveyed.

This survey in one state probably reflects dental practices that are prevalent in other areas throughout the country. Dentists practicing in this state had received their dental education at 81 schools located at sites throughout the country. Schools in the north, central and southern Atlantic seaboard states, as well as mid-western schools, are heavily represented among the 81 dental schools. Dentists in the various age groups were represented. Approximately one third of the dentists graduated dental school during, respectively, each of the three time periods: (1) prior to 1926; (2) between 1926 and 1945; and (3) 1946 or later.

This survey of oral anesthetic injection procedures that are in common use has provided baseline data for studies designed to ascertain the hazards, and to provide prophylactic measures against bacterial and viral infections that might

Table 5 • Responses indicating speed of injection of local anesthetic

Response	Number of answers	Per cent of 666 dentists
Slow* (Approx. 1 cc/minute)	497	74.6
Intermediate (Speeds between slow and rapid)	21	3.2
Rapid* (Approx. 2 cc/15 secs.)	151	22.7
No answer	6	0.9
Total	675*	

*Nine dentists checked both "slow" and "rapid."

Table 6 • Dentists indicating routine use of surface antiseptic or surface anesthetic or both prior to local injection of dental anesthetic

Use of surface antiseptic	Number of dentists using surface anesthetic						Total (using antiseptics)	
	Yes		No		Occasionally			
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	196	29.4	68	10.2	19	2.9	283	42.5
Occasionally	9	1.4	2	0.3	0	0	11	1.7
No	238	35.7	66	9.9	13	2.0	317	47.6
No answer, but antiseptic listed	28	4.2	7	1.1	6	0.9	41	6.2
No answer, no antiseptic listed	10	1.5	1	0.2	3	0.5	14	2.1
Total (using anesthetics)	481	72.2	144	21.6	41	6.2	666	—

be incurred through dental injections. Follow-up laboratory and clinical studies have been reported[1] and will be presented later.

SUMMARY

A state-wide survey of technics in common use for local dental anesthetic injections was carried out among practicing dentists. Data were furnished by 666 dentists, or 52.4 per cent of the 1,272 dentists surveyed.

Data were compiled and tabulated listing the dental schools graduated, as well as the dates of graduation of all dentists now in practice in the state. The dentists were found to have graduated from 81 schools located throughout the United States and Canada. Because of the representative educational background of the dentists surveyed, it would seem that the dental procedures in use by these dentists are representative of those used in dental practices in other areas throughout this country.

The survey provided information as to the relative use of various methods of sterilization of dental injection needles, syringes and anesthetic cartridges, the use and re-use of anesthetic cartridges and needles for individual or multiple patients, and the average amount of local dental anesthetic used, as well as the speed of injection of such anesthetic. Information was also provided as to the relative use of topical antiseptics and anesthetics prior to the injection of local dental anesthetics.

This study has provided impetus for further clinical and laboratory investigations with the object of obtaining basic information as to the need for the prevention of microbiological infection that might be incurred through injection of local dental anesthetics.

X-ray protection in the dental office

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The Council on Dental Research has considered carefully the recommendations of the American Academy of Oral Roentgenology for achieving "x-ray protection in the dental office." The members of the Council believe that the report contains so much information of value to the dental practitioner that it should be published in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION in order to reach the widest distribution possible.

Exposure of the human body to x-ray radiation from any source is biologically undesirable. Therefore, the dental profession should make every effort to reduce the exposure to x-rays of its personnel and patients to the lowest limit consistent with dental necessity. If the dental profession does not take steps to use x-ray radiation more efficiently and judiciously, then governmental regulations regarding the use of dental x-ray machines probably will be forthcoming in the future.

The National Committee on Radiation Protection has issued recently revised recommendations relative to permissible radiation exposures. The net effect of these recommendations is to reduce the average basic maximum exposure limit from 0.3 to 0.1 r per week.

In light of present knowledge, the exposure of one who is occupationally exposed to x-ray radiation at the rate of 0.1 r per week is not expected to cause any detectable bodily injury at any time during his lifetime.

For individuals not occupationally exposed to x-ray radiation, the following recommendations have been made to limit the exposure of the reproductive cells for genetic reasons.

The average exposure of the population's reproductive cells to radiation above the natural background radiation, shall not exceed 10 roentgens over the period from conception up to age 30, and one third that amount in each decade thereafter.

PROTECTION FROM RADIATION FOR DENTIST AND DENTAL PERSONNEL

Exposure from useful radiation, secondary radiation and leakage radiation must not exceed 0.1 r per week.

Report prepared by the Committee on Radiation Protection of the American Academy of Oral Roentgenology.

*Associate professor of dentistry, School of Dentistry, University of Michigan.

†Clinical professor of oral roentgenology, University of California School of Dentistry, San Francisco.

‡Associate professor of dentistry (oral surgery), College of Dentistry, University of Ohio.

Table 1 • Requirements for protection of dentist and auxiliary dental personnel from useful beam of dental x-ray machine

Indicated tube potential kvp	Workload ma-sec/day	Thickness of lead required for a primary barrier at a target-to-occupied-area distance of						
		3 ft.	4 ft.	5 ft.	6 ft.	8 ft.	10 ft.	20 ft.
		mm.	mm.	mm.	mm.	mm.	mm.	mm.
65	9,600	1.1	1.0	0.9	0.8	0.7	0.6	0.4
	2,400	0.8	0.7	0.6	0.6	0.5	0.4	0.3
	600	0.6	0.5	0.4	0.4	0.3	0.3	0.1
	150	0.4	0.3	0.3	0.2	0.2	0.1	0
90	3,840	1.9	1.7	1.5	1.4	1.2	1.1	0.7
	960	1.4	1.2	1.1	1.0	0.8	0.7	0.4
	240	1.0	0.8	0.7	0.6	0.5	0.4	0.2
	60	0.6	0.5	0.4	0.3	0.2	0.2	0

Dental rooms containing x-ray machines should be provided with a primary protective barrier in the walls at the sides and behind the chair to a height of six feet, and in the floor and ceiling. Unless there is reason to assume otherwise, a workload of 2,400 ma-sec/day with 65 kvp (960 ma-sec/day with 90 kvp) should be used for a small general dental office, and a workload of 9,600 ma-sec/day with 65 kvp (3,840 ma-sec/day with 90 kvp) for a busy dental roentgenographic room. Use one-quarter of the workloads previously mentioned and the appropriate distance to determine the proper thickness of the primary protective barrier for the walls. Use one-sixteenth of the previously mentioned workloads to determine the primary barrier thickness in the floor and ceiling. The proper thickness of a shield to be used within the x-ray room can be read directly from the table for a given workload and distance.

I. Protection from Useful Radiation • A. Never stand unprotected in the path of the useful x-ray beam that passes through the cone of the x-ray machine.

1. Never use your fingers to hold a film packet in the patient's mouth while the x-ray machine is operating.
2. Intraoral fluoroscopic mirrors should not be used.
3. Neither the tube housing nor the pointer cone should be held by hand while the x-ray machine is operating.

B. When it is not possible to avoid the path of the useful beam, protective barriers and distance should be used for the protection of the dentist and auxiliary dental personnel (Tables 1, 2). Commercial sources for sheet lead, lead bonded to plywood, lead core doors, lead shields, leaded lath, leaded glass, leaded rubber, and cinder blocks and concrete blocks containing sheet lead are listed in Appendix I.

II. Protection from Secondary Radiation • Most secondary radiation originates at the patient's face. This secondary radiation scatters in all directions while the x-ray machine is operating and ceases when the exposure is terminated.

Protection from the radiation which scatters from the patient's face usually can be achieved by allowing an adequate distance between the patient's face and the nearest part of the operator's body. A dental x-ray machine, equipped to function with 10 milliamperes, total filtration equivalent to 2.00 mm. of aluminum and a useful beam measuring 2.75 inches in diameter at the end of the short cone, could be operated for the number of seconds per day as shown in Table 3, depending on the voltage and distances involved, before the operator would receive the maximum permissible exposure of 0.1 r per week.

If no lead diaphragm were used to limit the diameter of the x-ray beam to 2.75 inches and the total filtration were only equivalent to 0.5 mm. of aluminum, then the permissible daily workloads would be one-quarter of the values listed in Table 3.

In many dental offices, a longer cord

Table 2 • Requirements for protection of dentist and auxiliary dental personnel from useful beam of dental x-ray machine

Indicated tube potential kvp	Workload ma-sec/day	Thickness of concrete required for a primary barrier at a target-to-occupied-area distance of—						
		3 ft.	4 ft.	5 ft.	6 ft.	8 ft.	10 ft.	20 ft.
		in.	in.	in.	in.	in.	in.	in.
65	9,600	3.7	3.4	3.1	2.9	2.5	2.3	1.5
	2,400	2.9	2.5	2.3	2.0	1.7	1.5	0.8
	600	2.0	1.7	1.5	1.3	1.0	0.8	0.2
	150	1.3	1.1	0.8	0.7	0.4	0.2	0
90	3,840	5.7	5.2	4.8	4.4	3.9	3.5	2.2
	960	4.4	3.9	3.5	3.2	2.7	2.2	1.2
	240	3.2	2.7	2.2	1.9	1.5	1.2	0.3
	60	1.9	1.5	1.2	0.9	0.5	0.3	0

These data are used in the same manner as described in the explanation following Table 1.

on the timer will allow the operator to move farther away from the patient than is possible with the present cord. Remember, safety increases with the distance from the patient.

The safest positions for the operator of a dental x-ray machine during the exposure of dental films are given in the order of preference:

1. Behind the head of the x-ray machine.

2. At right angles to the direction of the x-ray beam. When the right angle location permits a choice of standing in front of or behind the patient, stand behind him. It is by far a safer spot.

If, for a given distance between the patient and operator, the actual daily workload is greater than the permissible daily workload listed in Table 3, then a barrier is necessary to afford protection from the secondary radiation coming from the patient's face. The appropriate thickness for the secondary barrier is indicated in Table 4 for various distances and workloads.

III. Protection from Leakage Radiation • The problem of leakage radiation is very small with most x-ray machines that have been manufactured recently. The amount of secondary shielding provided for in Table 4 is sufficient to afford protection from normal leakage radiation. Older x-ray machines are more likely to have inadequate or faulty shielding in the tube housing and around the portal. This leakage can be discovered with radiation detection instruments or with films. If leakage radiation is found to be present, a lead jacket should be made to cover the faulty area.

IV. Film Badge Service • The amount of x-ray radiation that reaches the body of the dentist or of the auxiliary dental personnel can be measured accurately and economically with a film badge. These badges can be obtained from the laboratories listed in Appendix II. The film badge is worn on the clothing for

Table 3 • Permissible daily workload with 65 kvp and 90 kvp at 10 ma.

Distance between patient and operator (feet)	Permissible daily workload with 65 kvp (seconds)	Permissible daily workload with 90 kvp (seconds)
2	60	25
3	140	60
4	240	105
5	380	165
6	540	240
8	960	425
10	1,500	665

one or two weeks, or for one month and is then returned by mail to the laboratory where it was purchased originally. At the laboratory the film in the badge is carefully processed and its exposure is evaluated. The amount of radiation recorded by the film badge is a measure of the exposure of the wearer of the film badge. He is notified by mail of the amount of his exposure.

Film badges can be obtained on a weekly, biweekly or monthly basis. With some laboratories, contracts are required which state that film badges will be accepted for a minimum of 13 consecutive weekly, biweekly or monthly periods. Other laboratories set no limit on the minimum length of time for which the service is desired. The cost for one badge per period usually is $1 and the unit cost of additional badges per period is about 65 cents.

V. Ionization Chamber Dosimeters • The amount of radiation received by dental personnel can be measured accurately and also quickly with ionization chamber dosimeters. The cost of such equipment ranges approximately from $50 to $150. Suppliers of ionization chamber dosimeters are listed in Appendix III.

PROTECTION FROM RADIATION FOR THE PATIENT

I. Learn the inherent filtration of your x-ray machine. This information can be obtained from the manufacturer or from Table 5.

Filtration of the useful beam is accomplished through the use of inherent and added filtration. Inherent filtration is caused by the absorption of the beam by the glass window of the x-ray tube, the oil which surrounds the tube, the portal in the x-ray head through which the rays emerge, and the plastic cone. Added filtration is obtained by placing thin sheets of aluminum in the plastic cone to filter further the useful beam. Total filtration is the sum of the inherent and added filtration.

It is recommended that filtration, equivalent to a total of 2 mm. of aluminum, should be used with dental x-ray machines.

To bring the total filtration of a dental x-ray machine up to the equivalent of 2 mm. of aluminum, the dentist can obtain from the manufacturer of his x-ray machine, or can himself cut out, one or more disks of commercially pure aluminum of suitable thickness to make up the difference between the inherent filtration

Table 4 • Requirements for protection of operator of x-ray machine from the radiation scattered from the patient's head

Tube potential kvp	Actual workload ma. sec/day	Thickness of secondary barrier required for the following distances from the patient							
		3 ft.	4 ft.	5 ft.	6 ft.	3 ft.	4 ft.	5 ft.	6 ft.
		Barrier of lead				Barrier of concrete			
		mm.	mm.	mm.	mm.	in.	in.	in.	in.
65	9,600	0.50	0.40	0.3	0.2	1.4	0.9	0.7	0.5
	2,400	0.2	0	0	0	0.5	0	0	0
	600	0	0	0	0	0	0	0	0
	150	0	0	0	0	0	0	0	0
90	3,840	0.7	0.5	0.4	0.3	2.0	1.3	1.0	0.7
	960	0.3	0	0	0	0.7	0	0	0
	240	0	0	0	0	0	0	0	0
	60	0	0	0	0	0	0	0	0

The required thickness for a secondary barrier can be read directly from the table for a given actual workload and distance.

Table 5 • Inherent filtration data

Name of x-ray machine	Equivalent inherent filtration (mm. aluminum)
General Electric	
CDX Models E, 70 and 90	1.5
Ritter	
Models B and Dual-X	0.5
Model E (Century)	2.00-2.25
Universal	0.5–0.75
Weber	
Raydex	0.5
Westinghouse	0.7
X.R.M.	
Models 2 and 3 before 1956	0.75
Models 2 and 3 since 1956	2.00
Model 90	2.00

listed in Table 5 and the recommended total filtration equivalent to 2 mm. aluminum (see Table 6).

Commercially pure aluminum is commonly designated as 1,100 or as 2S. For some dental x-ray machines, the added filtration may be as great as 1.5 mm. aluminum. When this maximum amount of added filtration is used, it will be necessary to increase the usual times for exposure by about 40 per cent, but the facial dose will be decreased by approximately 55 per cent and the gonadal dose and the operator's dose will be reduced by approximately 30 per cent. With less added filtration, the exposure need not be increased so much.

II. Limiting Diameter of Useful Beam • Limit the diameter of the useful x-ray beam to 2.75 inches at the end of the cone, regardless of the length of the cone. This limitation on the diameter of the useful x-ray beam is accomplished by placing a diaphragm of lead, with a suitable aperture in it, in the path of the beam. Usually such diaphragms are made of 1/16 inch sheet lead and are located in the base of the cone on the machine. Sometimes, suitable diaphragms can be obtained from the manufacturer. Satisfactory diaphragms of lead can be made at home easily, because sheet lead can be cut readily with a scissors or pocket knife. Suitable lead, designated as "4 pound" sheet lead, can be obtained at plumbing shops. Reducing the diameter of the x-ray beam, for example, from 3.5 inches to 2.75 inches does not change the time of exposure, but does reduce the facial dose by approximately 38 per cent and the gonadal or scattered dose by approximately 30 per cent.

For several brands of dental x-ray machines that were manufactured prior to 1956, there are listed in Table 6 the dimensions of the lead diaphragm and its aperture that would reduce the diameter of the useful x-ray beam to 2.75 inches at the end of the short pointed cone.

III. Reducing the Amount of Radiation Used to Expose Each Film •

A. *Use "ultra-fast" film.* Changing from "intermediate" to "ultra-fast" film reduces the time of exposure, patient's facial dose, patient's gonadal dose, and radiation scattered to the dentist by about 80 per cent.

1. To use "ultra-fast" films with the older mechanical timers—
   (a) Operate with 5.0 milliamperes of current instead of 10, and double the time of exposure, or

Table 6 • Dimensions for aluminum filters and lead diaphragm

Brand of x-ray machine	Diameter of aluminum filter and lead diaphragm	Diameter of aperture in lead diaphragm
Fischer	2.44 inches	1.57 inches
General Electric*	2.00 inches*	*
Ritter	2.60 inches	1.55 inches
Weber	1.44 inches	0.89 inches
X.R.M.	2.67 inches	0.86 inches

*For the General Electric C D X machine, a lead diaphragm, containing an aperture 1¼ inches in diameter, is an integral part of the pointed cone. This aperture limits the diameter of the useful x-ray beam to 2.75 inches at the tip of the short pointed cone; therefore, no other lead diaphragm is required for this machine. When an aluminum filter is to be added, it must be large enough to cover the entire aperture in the lead diaphragm. "Sticky wax" has been used successfully to hold filters and diaphragms in place.

(b) Double the length of the cone and quadruple the time of exposure.

2. Accurate electronic or synchronous motor timers can be purchased as replacements for the "old-fashioned" mechanical timer (see Appendix IV).

B. Prolonging the Time for Development of Films • A 20 per cent reduction in time of exposure, patient's facial and gonadal doses, and operator's dose can be realized by changing from 3 to 5 minutes' developing time at 68° F. with high-energy developers.

C. Increasing the Voltage from 65 to 90 kvp • Increasing the voltage from 65 to 90 kvp permits the time of exposure to be reduced 64 per cent, the facial dose by 28 per cent, and the gonadal dose and the operator's dose by 13 per cent.

Tests have indicated that a complete x-ray examination made with 14 exposures and the following technical factors, exposed the gonads of the adult male to an absorbed tissue dose of 0.45 milliroentgens, which is only slightly more than his daily exposure of about 0.40 milliroentgens from sources of natural radiation such as cosmic rays, and so on:

Technical factors:
- 65 kvp
- 10 ma
- 7 inch cone
- 2.75 inch diameter beam at end of cone
- 2.25 mm. of aluminum—total equivalent filtration
- 5.9 seconds—total time of exposures
- Ultra-fast film

APPENDIX I: SUPPLIERS OF BARRIER MATERIALS

Ameray Corporation
Route 46
Kenvil, N. J.

Andel & Company
5218 N. Kedzie Ave.
Chicago

Bar-Ray Products, Inc.
209 - 25th St.
Brooklyn 32

Division Lead Co.
7742 W. 61st Pl.
Summit, Ill.

General Electric Company
X-ray Department
4855 Electric Ave.
Milwaukee 1

General Lead Construction Corp.
1800 Harrison Ave.
Kearney, N. J.

Keleket X-ray Corporation
Covington, Ky.

Keller Products, Inc.
37 Union
Manchester, N. H.

O. G. Kelley & Co.
98 Taylor St.
Dorchester 22,
Boston

Met - 1 - Wood Corporation
6755 W. 65th St.
Chicago 38

Ray Proof Corporation
843 Canal St.
P.O. Box 1454
Stamford, Conn.

Westinghouse Electric Corporation
X-ray Division
Baltimore

Wolf X-ray Products, Inc.
59 Bank St.
New York 14

APPENDIX II: FILM BADGE SERVICE

American Electronics, Inc.
9459 W. Jefferson Blvd.
Culver City, Calif.

Atomic Research Laboratory
10717 Venice Blvd.
Los Angeles 34

Bar-Ray Products, Inc.
209 25th St.
Brooklyn 32

Cambridge Instrument Co., Inc.
3630 Grand Central Terminal
New York 17

Isotopes Specialties Co.
703 S. Main St.
Burbank, Calif.

R. S. Landauer, Jr. & Co.
24 Plaza
Park Forest, Ill.

Nuclear Consultants, Inc.
31 - 61 Crescent St.
Long Island City 6, N. Y.

Nuclear Corp. of America, Inc.
350 Fifth Ave.
New York 1

Nuclear Instrument and Chemical Corp.
229 W. Erie St.
Chicago 10

Nucleonic Corp. of America
196 DeGraw St.
Brooklyn 31

Picker X-ray Corp.
25 S. Broadway
White Plains, N. Y.

Radiation Detection Co., Inc.
576 College Ave.
Palo Alto, Calif.

Reed-Curtiss Nuclear Industries, Inc.
9459 W. Jefferson Blvd.
Culver City, Calif.

St. John X-ray Laboratory
Califan, N. J.

A. M. Samples Machine Co.
208 Fazewell Pl.
Knoxville 18, Tenn.

Technical Associates
140 W. Providencia Ave.
Burbank, Calif.

Technical Operations, Inc.
6 Schouler Court
Arlington 74, Mass.

Tracerlab, Inc.
1601 Trapelo Rd.
Waltham 54, Mass., or,
2030 Wright Ave.
Richmond, Calif.

Volk Radio Chemical Co.
5412 N. Clark St.
Chicago 40

Whitehead and Hoag Co.
272 Sussex Ave.
Newark 1, N. J.

APPENDIX III: IONIZATION CHAMBER DOSIMETERS

American Electronics, Inc.
211 Chico Ave.
El Monte, Calif.

Baldwin Instrument Company, Ltd.
Brooklands Works
Dartford, Kent, England

Bar-Ray Products, Inc.
209 25th St.
Brooklyn 32

Arnold O. Beckman, Inc.
1020 Mission St.
South Pasadena, Calif.

Landsverk Electrometer Co.
550-552 W. Garfield Ave.
Glendale 4, Calif.

Librascope, Inc.
808 Western Ave.
Glendale, Calif.

NRD Instrument Co.
6427 Etzel Ave.
St. Louis 14

Nuclear Instrument & Chemical Corp.
229 W. Erie Street
Chicago 10

Bendix Aviation Corp.
Cincinnati Division
203 W. Third St.
Cincinnati 2

Cambridge Instrument Co., Inc.
3093 Grand Central Terminal
New York 17

Chatham Electronics Corp.
Livingston, N. J.

Cinema-Television, Ltd.
Worsley Bridge Rd.
London S.E. 26, England

Detectolab, Inc.
6544 N. Sheridan Rd.
Chicago 26

Devtron Engineering
1 Winslow St.
Redwood City, Calif.

Electromation Co.
116 S. Hollywood Way
Burbank, Calif.

El-Tronics, Inc.
5th and Nobel Sts.
Philadelphia 27

Pacific Transducer Corp.
11836 S.W. Pico Blvd.
Los Angeles 64

Reed-Curtis Nuclear Industries, Inc.
307 Culver Blvd.
Playa del Rey, Calif.

Special Instruments Lab.
"Spinlab"
312 W. Vine Ave.
Knoxville, Tenn.

Tracerlab, Inc.
130 High St.
Boston 10

Universal Atomics
36 Sylvester St.
Westbury, L. I., N. Y.

Victoreen Instrument Co.
5806 Hough Ave.
Cleveland 3

X-Ray Dept., General Electric Co.
4855 Electric Ave.
Milwaukee

APPENDIX IV: REPLACEMENT TIMERS

Electronic timers	Approximate price
1. Electronic Control Corporation 1573 E. Forest Ave. Detroit 7	$ 70.00
2. Farmer Electric Products, Inc. 2300 Washington St. Newton Lower Falls, Mass.	$ 75.00
Synchronous motor timers	
1. Industrial Timer Corporation 1407 McCarter Highway Newark 4, N. J.	$ 50.00
2. X-ray Mfg. Corporation of America 1750 Plaza Ave. New Hyde Park, N. Y. (For use with older XRM machines only)	$150.00

Banded-cast metal crowns

Claude R. Baker, D.D.S., M.S., Chapel Hill, N. C.

This paper describes a practical and rapid technical procedure for constructing a clinically satisfactory complete metal veneer banded-cast type of crown. The technic deviates from the procedure more commonly utilized in that it eliminates the custom makeup of a fitted band from flat plate gold stock requiring the sweating or soldering so frequently disliked by many dentists. This banded-cast type of crown must not be confused with the other types which use rolled stock gold plate such as the swaged, or the swaged-cast or soldered combination methods.

TOOTH PREPARATION

The requirements sought in a tooth preparation to receive a complete veneer metal crown are well known. However, when a metal tube is to be slip fitted to the preparation contour closely in the gingival third, the axial walls of the preparation should be as straight and chamfer-free as possible. This is the major difference between the preparation for a banded-cast type of crown and the all-cast type.

If the axial surface is instrumentally reduced to a curve by the inclusion of a chamfer terminal form, the mild ledge produced thereby, although of advantage to indirect technics which require reproduction impressions and wax adaptation to a die, is likely to interfere with the proper seating of a close, direct-fit metal tube or band (Fig. 1 and 2). The straight, flat walled preparation (A in Fig. 1) will receive the rolled stock material more readily than if an attempt is made to adapt it to the chamfered terminal preparation as in Figure 2. The operator must keep in mind that any shoulder or ledge development at the gingival extent of the preparation will interfere with the adaptation of band stock material in this area.

THE BAND

Of prime concern is the choice of the band to be used since it differs from the makeup of the band from flat plate gold stock ordinarily used, giving this technic its advantage and ease in crown construction. This is done by acquiring from any major gold refiner a selection of gold bands sized 5 to 18 (copper band sizes) in 32 gauge stock ⅜ inch long. It is convenient to retain this selection on a numbered disbursing block the same as one on which a copper band selection is kept (Fig. 3).

With the preparation complete and the entire adjacent natural environment as a guide, the selection of the band sized to close circumferential adaptation is made. If desired, this dimensional requirement may be explored for from the copper band selection and when found, the size transmitted by note of the band number to the gold band stock supply. The time requirement approximates that given to the careful selection of a band suited to impression-taking for an indirect technic.

Professor, crown and bridge dentistry, Dental School, University of North Carolina.

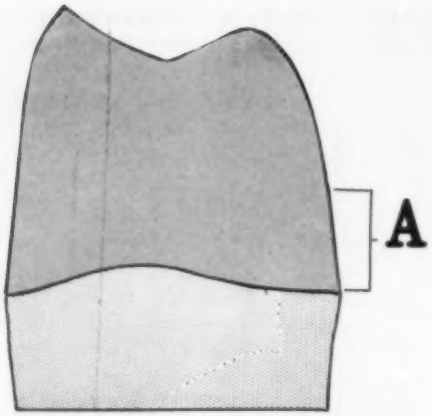

Fig. 1 • Note straight axial walls in gingival one third (A) for best adaptation of band stock material

After practical experience with the adaptation of many different gold plate alloys, the author has found that a gold base plate stock material known as Zephyer metal is ideally suited to the job. This alloy does not oxidize in the mold, and complete adherence of the cast surface to the band is usual. It is thoroughly malleable.

The technological success of the crown is due largely to the fitting of the band as judged by the closeness of the axial adaptation and by the sufficiency of the clinical length. The dentist must exercise his ingenuity and develop skill to fulfill these requirements by accurately festooning the gingival and by stretching or shrink-molding the band as close to a terminal gingival peripheral fit as possible. Although the contact of the band to the entire circumference of the gingival third of the preparation is required for the crown's retentive advantage, it is not critical to other portions of the preparation. Indeed, the band may skip over whole regions of excavated tooth structure, itself serving in turn as a matrix for the cement bond at the time of the final seating. Furthermore, if contact of the band does not occur in the middle or occlusal thirds with the preparation, there is an advantage to be had from the resulting greater volume of residual insulating medium. It can be said that still another advantage in the slip fit band technic is to be had when it is applied where large bulks of filling material and large portions of dentin have been removed by excavation. The walls of the fitted band automatically form the inner core of the crown and eliminate the time-consuming and difficult operation of building up an inner core of material to help form the preparation and serve as an impression base as required in an indirect technic (Fig. 4).

The occlusal extremity of the band is treated by festooning free of any contact interference with opposing articular surfaces. No soldered cap is needed. The periphery of the occlusal extremity of the band is slit intermittently all the way around, and it may be found advantageous to make V cutouts at the four corners, depending on the case requirement. It is essential to retain complete continuity of the band material only in the gingival third. The middle and occlusal thirds of the band are molded toward the center

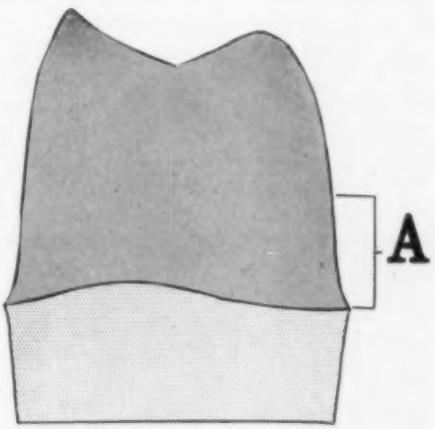

Fig. 2 • Note chamfered terminal to preparation form (A) best suited to indirect technics

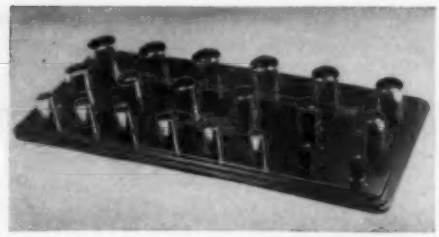

Fig. 3 • Manufactured gold band selection 32 gauge ⅜ inch long on numbered disbursing block

core of the preparation placing all of the band wall material well within the intended axial contours to be fashioned in wax all around (Fig. 5).

With the band completely fitted and seated on the tooth a gob of warm softened inlay wax is placed in position. The patient is requested to close and register all functional mandibular movements. With the natural positional relationships of all anatomical parts directly at hand the dentist has a trustworthy guide for creating the surface morphological requirement of the crown in its entirety.

With reasonable care on handling, the band and its overlying wax bulk may be withdrawn easily. A large part of the wax carving is done outside the mouth and the crown form rechecked directly in the mouth as the dentist may desire. With the open end of the crown held up, internal removal of excess wax bulks that have been forced into large regions of tooth excavation is accomplished easily and is advisable. If, for example, the entire bulk of the occlusal surface of the tooth has been removed, it is well to leave a finger of wax protruding into this region to remain in contact with the preparation itself to serve as an occlusal stop when the crown is cemented to position (B in Fig. 4).

Although many have advocated in the past that the last 2 mm. of the gingival end of the band be left free of wax and not cast so as to allow for a final opportunity to check fit the terminal adaptation directly to the tooth surface after the casting is made, this step may be eliminated as a routine requirement. However, instances will arise where to follow this procedure would be wise. The band alloy herein recommended is so efficient that only occasionally does a void occur in the cast bulk contour adjacent to the gingival aspect. If such occurs a spot of solder will rectify the exclusion. The dentist steps from the chair with a crown to cast, not a die to pour. The saving of time is obvious to those who work without the assistance of a laboratory assistant. No special casting procedure is necessary. The crown is finished with the usual attention to the proper surfacing of the metal.

ADVANTAGES

Assuming that careful attention is given to the fitting of the band and all technological detail, the following are some definite advantages in using the banded

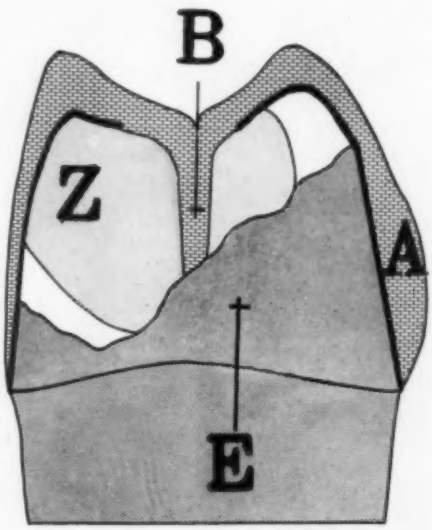

Fig. 4 • Z, wax bulk forced inside band. B, cast piller stop. A, carved wax crown form. E, remaining healthy dentin (preparation)

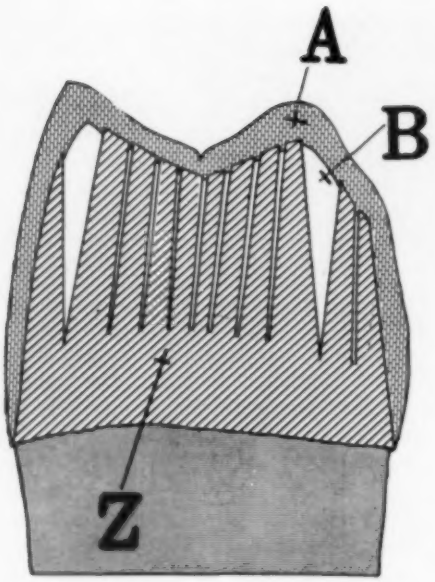

Fig. 5 • Z, band material. A, wax crown form. B, preparation core form

type of crown as compared with the modern, popular, full-cast crown:

1. It is a direct, not an indirect procedure.

2. The fit of the crown as to axial metallic contact and proper clinical length is assured directly before the casting is made.

3. The critical vertical shortage too often seen in the cast method is less likely to occur when a slip fitted band, properly sized, is carried over the preparation since it usually is adapted farther into the free gingival crevice. Consequently a greater protection is provided for the underlying natural tooth structure in this critical region.

4. A smooth even bulk of metal at the gingival end of the crown is provided automatically by the gauge thickness of the rolled stock material. Acquiring an even bulk thickness of wax for the cast procedure to give the same result in this region is difficult and time-consuming.

5. The knife-edged, minute saw-tooth periphery so frequently the result in the finished all-cast crown is absent when a band is employed.

6. Gross observance of a pathological reaction of the free gingiva about a crown provoked by the contact of ragged metal with soft tissue is less common in the banded than in the all-cast methods.

COMMENT

It is important to recognize and understand the prime factors of the value of a technical method as they relate to the health constituent. This hypothesis is fundamental in evaluating and selecting from our various restorative dental health treatment technics. For example, the health value in the creation of an all metal crown as a substitute for the coronal surface of a natural tooth is in no way related to or measured by the technic of its fabrication. However, the form and surfacing of the metal, the fit and adaptation at the gingival, proper axial morphology, correct contact relationship, and proper functional occlusal form synthesize into a physiologically acceptable substitution which becomes a recognized health treatment. In short, given an all metal crown that meets the proven clinical physical requirements, there is no measurable difference in its health value whether it is all-cast, banded-cast, swaged, soldered, or selected stamped from a manufacturer's stock die. Whatever procedure or technic is the easiest and most

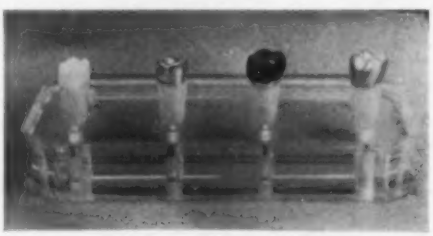

Fig. 6 • Models showing crown development

convenient for the individual dentist, assuming he maintains a conscientious desire to fulfill the clinical requirements underlying the health effort, is the one most wisely selected.

The volume of banded crowns produced in American dentistry at the present time is a fraction of what it has been in the past. Indeed, teaching of the technic has been dropped in many of our dental centers of learning. However, many fine clinical dentists trained in decades past who were schooled and later experienced in the use of rolled plate gold stock in the basic makeup of all metal crowns, still do so artfully and well. Examples of these crowns that have been retained in a healthy state for 30 years and more have been seen, and not to recognize their worth is to throw aside a ready and valuable clinical treatment. There is no necessary derogation in the technical procedure of slipping a properly sized and formed band over a suitable full crown preparation.

After a number of years spent in the makeup of a great many different types of metal crowns and observation of their clinical degree of acceptance, the author has become more and more sympathetic to the technical procedure involving the primary direct adaptation via the properly sized rolled stock metal tube method. Especially for the dentist who works without a full time personally trained laboratory technician at hand, the greater simplicity of the technic along with the time saved is noteworthy when compared to the indirect all-cast procedure. As is the case in all technological dental methods repetition of the act under different clinical circumstances develops speed and accuracy, as well as the usefulness of the technic.

Radiation • A form of radiation, (energy propagation), is a reality throughout all space whether such space is occupied by matter or not. This radiation is of a texture, (frequency and amplitude), exceedingly fine. The very existence of this radiation is undetectable due to restrictions imposed upon man by the nature of matter. This radiation cannot be isolated as it permeates all space, all matter, and is the reservoir from which all energy is drawn and to which all energy is eventually returned. Matter itself is but the position of change of this radiation to forms of greater wavelength. All other forms of radiation are effects of the functioning of this basic property of matter as the seat of change in this "basic" radiation. Basic radiation maintains matter; matter maintains basic radiation.

The function of matter is the conversion of basic radiation. This conversion consists primarily of a directional change, a change in mode of propagation, though change in density of influence, with time frequency and wavelength, must also be involved. Since it is this process which endows matter with its sole remaining unique property, its impenetrability, whereby it maintains its spatial integrity against other matter, it is evident that this property must be the atom. *George W. Hill, The Radiant Universe, 1952.*

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Editorials

Ratio of nation's expenditures for dental research to dental service one to two hundred

The newspaper headlines of March first reporting the President's loss of a molar re-emphasizes the fact that dental disease is no respecter of persons in high places. Since the days of George Washington, few of the nation's major executives have been immune to dental caries. Grover Cleveland, Theodore Roosevelt and Franklin D. Roosevelt—even his lady—were faced with dental problems. At least one vice-president, Aaron Burr, suffered from similar ailments. And now comes Mr. Eisenhower.

Quite properly, on occasions of this kind, the president has access to the highest type of dental service provided gratuitously by one of the nation's most competent dentists in one of the nation's most modern hospitals. Not all Americans are so privileged. Although most have access to competent dental care, few are spared the expense attached to it. This slight difference in economic arrangements is cited only because it provides an opportunity to make a few observations on the rising cost of dental neglect, the value of dental prevention and the need for more intensive dental research.

Although few of the forty per cent of America's 173 million who avail themselves of dental service find the cost alarmingly burdensome, such costs, considered collectively, are alarmingly high. The nation's annual dental bill amounts to more than a billion and a half dollars—more than two hundred times the amount spent each year to support dental research.

Few, acquainted with the successful war waged by science on various diseases, can doubt that the researcher eventually will discover the means to control dental caries and overcome many forms of periodontal disturbances, thereby saving the nation billions of dollars of needless expense in addition to needless suffering and inconvenience. This goal is not impossible of attainment but it will not be attained unless and until some organization—presumably the federal government—supports a practical, logical and efficient research program, including a coordinating agency staffed by competent investigators adequately housed and equipped with modern facilities.

For ten long years the Association has strongly urged such a program. In 1948 it requested Congress to provide funds for the construction of a building to house the National Institute of Dental Research.

For ten long years Congress has given the proposal sympathetic recognition but no appropriation other than token funds for architectural planning. During those ten years the American public has spent well over ten billion dollars for dental services. And this amount—vast as it is—would not begin to cover the cost of all the services needed.

Once again this year the Association is renewing its request to Congress for an appropriation of $3,700,000 to finance the construction of a building to house the National Institute of Dental Research. Three million seven hundred thousand dollars is a small sum indeed to spearhead a campaign against a disease that drains a billion and a half dollars from the public's pocket annually.

Businessmen, statesmen and economists who are concerned in preserving the nation's economy should be invited to join dentists who are concerned in preserving the nation's teeth in this effort to provide adequate housing and facilities for the National Institute of Dental Research. Only through successful research will men in high places as well as those in low—the princes and paupers of tomorrow—be saved the discomfort and expense with which dental diseases have long plagued mankind.

Dentistry as a career: competition for qualified students presents a challenge to the profession

The nation's growing interest in the physical sciences, a subject of headline importance for many months, is destined to bring about certain changes in America's educational pattern. Already the public's demand that more attention be paid to physical research, that more money be poured into research studies and that more qualified students be channeled into scientific pursuits are being felt in other fields. The increasing popularity of the physical sciences has sharpened the ever present competition for competent recruits and many promising high school students—fine timber for dentistry—are being attracted to other occupations. This is a situation of which the Association is keenly aware and one which it proposes to challenge.

The recruitment of highly qualified students for careers in dentistry is not only the concern of the American Dental Association, it is the concern of every practicing dentist, every dental educator, every dental researcher and every other person interested in the future of the profession. As the Council on Dental Education has recently advised constituent dental society officers, the need for increasing membership in the profession is of paramount importance. By 1962, for instance, which is but four short years away, more than 101,000 dentists will be required to maintain the 1955 dentist-population ratio. The long-range need for dentists and the demand for dental service cannot be measured with certainty, but the country's constantly increasing population is strongly indicative that the demand will grow increasingly greater with each passing year.

The progress of dental health of our citizens is tied in irrevocably with the progress of the nation, and whatever else may happen to the United States in the foreseeable future, its population will continue to expand. As of January 1 of this year the country's population reached a high of approximately one hundred and seventy-three million. By 1960 it is expected to reach one hundred and eighty million. It will pass two hundred and ten million by 1970 and will continue to climb with no peak in sight. Our present 47 dental teaching institutions are doing a magnificent job of training and feeding into the profession some 3,000 dentists annually. But dentistry loses some 2,100 annually through death and retirement. Because of the annual increase in population, the surplus of 900 to 1,000 dentists per year is not sufficient to maintain the current national dentist-population ratio of 1:1,900. In order to maintain that ratio a minimum surplus of 1,600 dental graduates is required each year, or at least 600 more than are being produced annually at present.

These statistics, even under normal conditions, indicate the necessity of maintaining an active dental student recruitment program within the confines of every constituent dental society. When there is added to the normal need the increasing competition offered by other disciplines, the necessity for increasing dentistry's recruitment program becomes doubly apparent.

Since World War II the dental profession has enjoyed a gratifying growth and, as the Council on Dental Education points out, the student recruitment program at present is satisfactory. Dental schools can still make up the majority of their freshmen classes from the upper forty per cent of the applications received. As new dental schools are built, however, and student enrollments are increased over present levels, the number of applicants must be increased in corresponding proportions to assure the reservoir of quality applicants which has been so vigorously maintained over the last decade.

The problem of maintaining a high recruitment level of highly qualified dental students could very well become acute if steps are not taken by the profession to meet the growing needs and the growing competition.

To aid dental societies, dentists and others interested in the future of the profession, the Council on Dental Education has prepared an attractive twenty page brochure entitled "Careers in Dentistry."[1] Armed with this little manual, every dental society and every practicing dentist can energetically and enthusiastically promote a dental student recruitment program in each community and secure for the profession a fair proportion of highly qualified students.

1. Council issues new booklet on careers in dentistry. J.A.D.A. 56:264 Feb. 1958.

The caries in the candy box

Candy sales are making a comeback, according to a recent survey[1] by an industry association. This is good news for the sugar and candy producers—not so good for people with teeth.

In 1954 the sales of candy had reached a 15 year low, with consumption in the United States averaging 16.5 pounds per person, the survey reports, compared with the all-time high of 20.5 pounds per person in 1944. By 1956, candy sales had climbed back to 17.4 pounds per person. Candy production in 1956 reached 2,893,000,000 pounds, an increase of 169,000,000 pounds over 1955. In 1956, some $1,071,000,000 was spent for candy, an increase of forty million dollars over 1955. Latest available figures for 1957 show that the dollar sales of candy are up 3 per cent over 1956.

Among the forces at work boosting candy sales, according to the survey, is television watching. This has tended to make us a nation of nibblers. As the hero gallops over the sagebrush, the viewer reaches for something to put in his mouth; eventually, the dentist must reach for his drill.

The increase in the consumption of candy is disheartening news for the dentists, physicians, nurses and teachers who are campaigning against undue consumption of sweets as a means of combating dental caries. It is well known that tooth decay is caused primarily by acids produced in the fermentation of carbohydrates and that the restriction of dietary sweets is effective in the control of this condition.[2]

Candy producers have never evidenced any responsibility in educating people that if they must indulge in sweets they should limit their choice to the least injurious confections and restrict their intake to regular mealtimes. Certainly sufficient evidence is at hand regarding the cariogenic effect of sweet snacks and sticky sweetmeats to warrant some words of warning from more conscientious confectioners.

The Sugar Research Foundation for years supported a fundamental dental research program at the Harvard School of Dental Medicine; it recently discontinued its support.[3] Many of the findings of project no. 3 of the Sugar Research Foundation indicated that sugar, in particular, and carbohydrates, in general, are primary factors in the causation of tooth decay. The degree of cariogenic activity depends on the form in which the carbohydrate is ingested and the rate at which it is cleared from the oral cavity.

"This detrimental aspect of sugars and carbohydrates," said Shaw[3] in summarizing a decade of dental research under project no. 3, "coupled with the possible means to counteract this influence, could readily be interpreted as areas in which the carbohydrate industries in general have a responsibility to the public to support research that would clarify the various issues involved."

It is regrettable that the Sugar Research Foundation has withdrawn its support from the Harvard program. Furthermore, it is inconceivable that the sugar industry, knowing as it must know of the dental damage caused by its product, does not do something about it. Certainly it would seem that the intelligent leaders in the industry would plow back some profits into research in an effort to discover some method of neutralizing the cariogenicity which results from high carbohydrate consumption.

1. Edge is restored on U. S. sweet tooth. Chicago Daily News, Jan. 29, 1958.
2. Tooth decay—what to do about it. Chicago, American Dental Association, 1955.
3. Shaw, James H. Caries-producing factors: a decade of dental research—project no. 3 of the Sugar Research Foundation, Inc. J.A.D.A. 55:785 Dec. 1957.

News of Dentistry

TRUSTEES APPROVE THREE MEMBER SPECIAL COMMITTEE TO DIRECT 1959 CENTENNIAL PROGRAM OF ASSOCIATION

The Board of Trustees, at its session March 10-12 in the Central Office, approved in principle a prospectus for the observance of the Association's centennial in 1959.

Association President William R. Alstadt was directed to appoint a special committee of the Board composed of three members including the president-elect to develop, organize and direct centennial activities. John R. Abel will serve as chairman of the special committee, with Fritz A. Pierson and Percy T. Phillips as members.

In addition, the Board considered and took action on reports by Councils on the Medicare program, family dental clinics at military installations and such measures as the Forand bill, which would extend certain hospital, nursing and surgical benefits to persons eligible for Social Security benefits.

The Board heard a report of the Special Committee on the Washington Office and authorized the removal of the office from its present location to larger quarters. The possible establishment of a women's auxiliary to the American Dental Association and the Survey of Dentistry were also the subjects of reports of special committees of the Board on which action was taken.

CENTENNIAL OBSERVANCE

The Special Committee on the Centennial was directed by the Board to submit a budget of centennial expenses to the Board at its September meeting. During the remainder of 1958, the committee was authorized to incur deferred charges against the 1959 budget.

Centennial activities with which the committee was authorized to proceed included special publications, such as a preliminary program, a souvenir program, and a history of the Association. The production of radio transcriptions and motion picture films and an extensive publicity and public relations program relating to the centennial were also authorized. The committee will consider problems connected with the centennial session to be held in New York September 14-18.

The Board also acted on other matters concerning expanded activities during the centennial year.

The Bureau of Dental Health Education was granted a supplemental appropriation of $4,000 for an increased amount of materials for the 1959 National Children's Dental Health Week. The appropriation was necessitated partly by increased printing costs and will provide additional materials for the centennial year observance.

PROPOSAL RELATING TO MEDICARE

A report on the development of a dental program for dependents of military personnel was made to the Board jointly by the Councils on Dental Health, Federal Dental Services and Legislation and the Bureau of Economic Research and Statistics.

The proposal for a dental care program was approved as conforming to existing policies established by the House of Delegates, and the report and its subsequent amendments will be presented to the House at the 1958 annual session.

The Board also resolved "that recommendations for experimentation in pilot programs for meeting the cost of dental care be subject to further scrutiny by the joint agencies in regard to (1) the

scope of services to be rendered under the program; (2) the indemnification aspects of the program . . ."

The committee report on the joint proposal stated:

In the immediate context of the Medicare program, the Association has taken the position that the federal government has the right to provide for those for whom it is responsible, health services as a benefit of employment. The extent of these benefits must be determined by the federal government's ability and willingness to provide the highest quality of dental health services. The Association's and the profession's role, once the extent of benefits has been determined, is to provide professional guidance in developing the program under which these benefits are provided. Such a program must insure full protection for the rights of the public, the profession and of the government.

MILITARY FAMILY DENTAL CLINICS

The Board reaffirmed the opposition of the Association to the establishment of family dental clinics at military installations, as stated in a resolution of the House of Delegates at the 1957 annual session. The following grounds were given:

1. It is professionally unsound for dental practice to be managed and controlled by a lay person or group. The final authority for the operation of the family dental clinics, including control over professional matters, is vested in lay persons. . . .

2. Congress has declared in Public Law 569, 84th Congress, that federal support for the health care of dependents should be uniformly available to all dependents. The family dental clinics cannot possibly achieve this objective.

3. The use of federal facilities and equipment by the family dental clinics constitutes, in the Association's opinion, federal financial support for dependent dental care in conflict with the restrictions contained in Public Law 569.

4. The combined efforts of this Association and the Department of Defense to develop a professionally acceptable plan for dependent dental care on a uniform basis should be given the wholehearted support of all military agencies. The establishment of family dental clinics by the Air Force may well impair the dental profession's cooperation with the acceptance of any plan for dependent dental care.

5. The hiring of dentists by unlicensed employers to provide dental care to civilians raised a serious question of conflict with state dental laws. Such employment, moreover, may place the employed dentists in difficulty under the codes of professional ethics of the societies to which they belong or the societies to which they apply for membership.

The Board also resolved that its statement be sent to the Assistant Secretary of Defense (Health and Medical), the Secretary of the Air Force and the chairmen of the Senate and House Armed Services Committees.

FORAND BILL AND SUCH MEASURES

A policy statement on the Forand bill and other similar measures was approved by the Board. The Board stated "that the plan for providing personal health care benefits to O.A.S.I. beneficiaries within the Forand proposal (H.R. 9467) and similar bills is in conflict with the Association's principles governing federal support of personal health care programs. . . ."

The Board directed the Council on Legislation to apply the principles, stated in the resolution, to testimony on the Forand bill and similar measures.

WASHINGTON OFFICE

The Board authorized the removal of the Washington Office from its present location to larger quarters.

This action was taken on the recommendation of a special committee of the Board which was appointed to make a study of the advisability of expanding the facilities of the Washington Office, in accordance with a 1957 directive of the House of Delegates.

The Special Committee on the Washington Office is composed of Arthur W. Easton, Paul H. Jeserich and Fritz A. Pierson, with Harold Hillenbrand as ex officio member.

The Board resolved that a report be

made to the House of Delegates stating that the larger quarters will provide for "predictable future expansion of personnel and activities of the Washington Office."

The Association's office in Washington, D. C., is under the direction of C. Willard Camalier, assistant secretary, who assists in the legislative and other programs of the Association.

WOMEN'S AUXILIARY

The Special Committee on Women's Auxiliary reported to the Board on its meeting with representatives of the National Association of Dental Auxiliaries. The Board discussed at length the proposed establishment and organization of a women's auxiliary to the American Dental Association and directed the special committee to draft a report to be presented to the House of Delegates at the 1958 annual session.

SURVEY OF DENTISTRY

The Board concurred with the American Council on Education in the designation of Dr. Byron S. Hollinshead as director of the Survey of Dentistry.

According to the report of the Special Committee on the Survey of Dentistry, Dr. Hollinshead plans to open the survey offices in Chicago April 1.

ANNUAL SESSIONS

The Trustees approved Atlantic City as the site of the 1963 annual session. The city for the meeting in 1962 is to be designated at a later date.

Approval was given to the appointment of Harry Spangenberg, Jr., of Columbus, Ohio, as vice-chairman of the Section on Roentgenology for the 1958 annual session. Dr. Spangenberg will fill the post vacated by Harrison M. Berry.

Approval was also given to the slate of section officers for the 1959 annual meeting. The following appointments were approved:

Anesthesiology • Daniel F. Lynch of Washington, D. C., chairman; Leonard Monheim of Pittsburgh, vice-chairman.

Operative Dentistry • Robert F. Eastman of New Orleans, chairman; Drexell A. Boyd of Indianapolis, vice-chairman.

Oral Surgery • Fred A. Henny of Detroit, chairman; Daniel J. Holland of Boston, vice-chairman.

Orthodontics and Oral Development • William R. Root of Buffalo, N. Y., chairman; Francis J. Loughlin of Jamaica, N. Y., vice-chairman.

Pedodontics • Kenneth E. Lawrence of Kansas City, Mo., chairman; Ralph McDonald of Indianapolis, vice-chairman.

Periodontics • Delbert P. Nachazel of Milwaukee, chairman; A. A. Ariaudo of San Diego, vice-chairman.

Practice Administration • William R. Mann of Ann Arbor, Mich., chairman; Glenn R. Brooks of Rochester, Mich., vice-chairman.

Complete Prosthodontics • Fred N. Harris of Pasadena, Calif., chairman; Chastain Porter of Kansas City, Mo., vice-chairman.

Partial Prosthodontics • John Adams of St. Louis, chairman; S. Howard Payne of Buffalo, N. Y., vice-chairman.

Public Health Dentistry • Maurice J. Friedman of Little Rock, Ark., chairman; Lynn L. Temple of Springfield, Mo., vice-chairman.

Research • Joseph C. Muhler of Bloomington, Ind., chairman; Barnet M. Levy of Houston, Texas, vice-chairman.

Roentgenology • Harry Spangenberg, Jr., of Columbus, Ohio, chairman; Theodore S. Grant of San Francisco, vice-chairman.

A supplemental appropriation was granted the Council on Scientific Session to cover travel expenses for the 12 section officers for 1959 to attend the May 12 meeting of the Council. Preliminary plans for the essay program at the centennial

session are to be considered at the meeting.

Members of the Local Arrangements Committee for 1959, under the chairmanship of William A. Fennelly, were also approved by Board action. They are:

Honorary Officers • W. McGill Burns, Arthur H. Merritt, Edward F. Mimmack, Myron A. Roberts, C. Raymond Wells.

Vice-Chairmen • K. Neil Donally, Gustav P. Frahm, Walter A. Quinn, Adolph G. Wagner.

Clinics and Motion Pictures • Stanley G. Standard, chairman; Alfred A. Lanza, vice-chairman; Albert J. Abeloff, Matthew Besdine, Emanuel E. Blumenthal, Bernard Clug, Leonard J. Eaton, Lester L. Eisner, William C. Hudson, Jr., Herman L. Malter, Donald H. Miller, Joseph L. Riesner, Edward J. Ryan, Frank S. Snell, Charles L. Storer, Alexander L. Ungar, Frank G. Youhass.

Entertainment and Social Events • Philip Back, chairman; Harold S. Horton, vice-chairman; John D. Burr, Wesley R. Burt, Joseph M. Glaser, Morton Heide, Robert L. Heinze, Roland E. Morse, George E. Mullen, Walter W. Stevens, Walter E. Taylor.

Information Services • William S. Curran, chairman; John T. Flynn, vice-chairman; Louis I. Abelson, J. Fred Folley, David E. Hunn, William H. Hyde, Daniel Jutton, E. Alan Lieban, Joseph W. Martin, Frederick F. Pfeiffer, Jr., Jack A. Salzmann, David Tanchester, Herbert L. Taub.

Interpreters • Ernest U. Baden, Lillian Barkann, Charles C. Berger, Edward N. Green, Henri Herz, Gustaaf Keesing, Dominic E. Nardone, Anthony F. Posteraro, Henry I. Wachtel.

Publicity • Samuel A. Isaacson, chairman; Wilbur J. Prezzano, vice-chairman; Leon L. Abbey, Alfred J. Asgis, Jack Barsh, Clifford C. Gregory, Manville S. Harris, O. J. McCormack, Frank X. McHugh, Anthony F. Posteraro, Edgar C. Schick, Jules B. Seldin, Rex T. Taylor.

Reception • Anthony S. Mecca, chairman; Clyde H. Schuyler, vice-chairman; Charles Amsterdam, Ralph J. Bowman, Andrew F. Catania, John C. Fowler, William J. Murphy, Raymond J. Nagle, Charles A. Pankow, Harry M. Seldin, Gilbert P. Smith, Franklin A. Squires, Isidore Teich, Charles A. Wilkie, Paul W. Zillmann.

Committee on Women's Entertainment • Mrs. William A. Fennelly, honorary chairman; Mrs. Bernard Clug, chairman; Mrs. Walter A. Quinn, vice-chairman; Mrs. Louis I. Abelson, Dr. Hannah J. Appel, Mrs. Peter L. Battista, Mrs. L. Gordon Berkey, Mrs. E. E. Blumenthal, Mrs. Ralph J. Bowman, Mrs. William McGill Burns, Mrs. John D. Burr, Mrs. K. Neil Donally, Mrs. Crawford S. Douglass, Mrs. Leonard J. Eaton, Mrs. John T. Flynn, Mrs. Joseph M. Glaser, Mrs. Max Goldstein, Mrs. George D. Greenwood, Mrs. Morton Heide, Mrs. Alfred A. Lanza, Mrs. O. J. McCormack, Mrs. Edward F. Mimmack, Mrs. Roland E. Morse, Mrs. Waldo H. Mork, Mrs. Augustave Neuber, Mrs. Sidney A. Riesner, Mrs. Myron A. Roberts, Mrs. Edward Schick, Mrs. Walter W. Stevens, Mrs. Walter E. Taylor, Mrs. C. Raymond Wells, Mrs. David Wurzel.

OFFICERS, TRUSTEES ATTENDING

Officers attending the spring meeting were: William R. Alstadt, president; Percy T. Phillips, president-elect; Arthur W. Kellner, first vice-president; J. Murray Gavel, second vice-president; Bruce F. Wilkinson, third vice-president; Gerald D. Timmons, speaker; Harold Hillenbrand, secretary; C. Willard Camalier, assistant secretary; Louis M. Cruttenden, assistant secretary; H. B. Washburn, treasurer; and Lon W. Morrey, editor.

Trustees at the meeting were: Arthur W. Easton, First District; Edward F. Mimmack, Second District; Charles H. Patton, Third District; Edward R. White, Fourth District; Howard B. Higgins, Fifth District; A. F. Schopper, Sixth District; Earl G. Jones, Seventh District; Robert J. Wells, Eighth District; Paul H. Jeserich, Ninth District; Lewis W. Thom, Tenth District; Fritz A. Pierson, Eleventh District; John S. Eilar, Twelfth District; and John R. Abel, Thirteenth District.

JACKMAN JOINS STAFF AS NEW FILM LIBRARIAN

The appointment of Herbert B. Jackman as film librarian in the Bureau of Library and Indexing Service was announced by Harold Hillenbrand, Association secretary.

Mr. Jackman began work in late March. He succeeded Miss Helaine S. Levin, who had served as film librarian since 1952 and who left her position at the end of January to become Mrs. Harold Dawson. She is presently living in San Francisco.

Herbert B. Jackman

Mr. Jackman attended Antioch College, Yellow Springs, Ohio, and received his Ph.B. degree from the University of Chicago, where he studied audio-visual education and also did graduate work in the field.

Mr. Jackman has had 12 years of experience in audio-visual work, having served as assistant to the director of the audio-visual center at the University of Chicago. He also served on the headquarters staff of the Film Council of America. Before joining the Association, he worked as a writer and film coordinator for the Portland Cement Association in Chicago.

Mr. Jackman is active in the Chicago Film Council and is familiar with planning programs utilizing audio-visual materials and with producing them.

He is married and has four sons.

PETERSON ASKED TO SESSION ON AUXILIARY PERSONNEL

Dr. Shailer Peterson, secretary of the Association Council on Dental Education, has been invited to participate in a session of the Expert Committee on Auxiliary Dental Personnel. The Committee session will be held June 30 to July 5 in Geneva, Switzerland, and is in connection with the activities of the World Health Organization.

The secretary of the Expert Committee, Carl L. Sebelius, issued the invitation.

DENTISTS URGED TO SUPPORT BUILDING PLAN FOR N.I.D.R.

Dentists were urged by the Council on Legislation to write their congressmen and chairmen of key congressional committees stating their support of an appropriation to construct a building for the National Institute of Dental Research.

A special *Information Bulletin* on the subject was to be mailed to all members of the Association about April 1.

President William R. Alstadt and J. Claude Earnest, chairman of the Council on Legislation, have sent letters to constituent and component society secretaries asking their aid in the drive.

President Alstadt in his letter to the secretaries in early March emphasized the critical need for support "if we are to obtain the $3,700,000 appropriation for the Dental Institute building this year."

In late February, the Council on Legislation gave testimony stressing the need for the appropriation in hearings before the House Subcommittee headed by Representative Fogarty.

The appropriation is still being considered by House and Senate committees. No provision was made for the building in the budget submitted by President Eisenhower.

Career Incentive Plan • Dr. Earnest urged the retention of the "career incentive" program for dental and medical officers in the Armed Forces in a letter to Representative Carl Vinson, chairman of the House Armed Services Committee. Dr. Earnest cited figures indicating an increase in the number of dentists who have applied for commissions since the career incentive program was instituted. Under the plan, officers receive a graduated amount of extra pay after serving for various periods of time.

The House Committee is presently considering several bills that would provide general pay increases for all military personnel.

APPELLATE COURT SUSTAINS DISMISSAL IN MICK CASE

The Appellate Court of New Jersey sustained the action of the trial judge in granting an involuntary dismissal of the $200,000 libel suit brought by Robert J. H. Mick of Laurel Springs, N. J., against the American Dental Association: Herbert B. Bain, director of the Bureau of Public Information, and Lon W. Morrey, editor. The court reported its decision on March 14.

Dr. Mick, an opponent of fluoridation, charged that he was libeled by a letter written by Mr. Bain and by publications of the Association.

Judge J. A. D. Freund, in giving the opinion of the Appelate Court, said:

> There is perhaps no area of human activity more vital than that of public health. Honest and fearless investigation, professional discussion and challenge of means and methods for the cure and prevention of disease should be encouraged and not suppressed for fear of libel. . . . Indications of the present public controversy over the subject of fluoridation can be seen daily in various media. The point is that the widest freedom of discussion and publication of views and their exchange on every side of such questions of public interest should be permitted and even encouraged within the limits of fair comment. . . .

The suit was dismissed last May by Judge Edward V. Martino, after the plaintiff's case had been stated.

NATIONAL HEALTH COUNCIL MEETS AT CENTRAL OFFICE

A meeting of executives of organizations participating in the National Health Council was held February 20 in the Central Office.

Lon W. Morrey, editor, American Dental Association, and Austin Smith, M.D., editor, American Medical Association, discussed such problems of publication as the selection of papers, style, editing and production. Reginald H. Sullens, associate secretary of the Council on Dental Education, American Dental Association, spoke on the recruitment of dental students and the aptitude testing program.

The group consisted of executives of some 30 organizations concerned with health which have their offices in the Chicago area.

INTER-ASSOCIATION MEETING HELD AT A.D.A. HEADQUARTERS

Representatives of six national health organizations attended a two day meeting of the Inter-Association Committee on Health February 28 and March 1 at the Central Office.

Organizations represented included the American Dental Association, American Hospital Association, American Medical Association, American Nurses Association, American Public Health Association and American Public Welfare Association.

In addition to reports on activities of the various organizations, speeches by

Representatives of various organizations participating in a meeting of the Inter-Association Committee on Health at the Central Office of the American Dental Association in February included: (Standing, l. to r.) Kenneth A. Easlick, A.D.A.; John W. Knutson, American Public Health Association; John D. Porterfield, A.P.H.A.; Edwin L. Crosby, American Hospital Association; Herbert Notkin, American Public Welfare Association; Madison Brown, A.H.A.; Berwyn F. Mattison, A.P.H.A.; Ray Amberg, A.H.A ; F. J. L. Blasingame, American Medical Association; Mrs. Judith Whitaker, American Nurses Association; Miss Ella Best, A.N.A.; Percy T. Phillips, A.D.A.; George M. Fister, A.M.A.; E. B. Howard, A.M.A.; Maj. Gen. Dan C. Ogle, surgeon general, U. S. Air Force; and Maurice J. Norby, A.H.A. Seated (l. to r.) are: Tol Terrell, A.H.A.; Miss Agnes Ohlson, A.N.A.; Harry O. Page, A.P.W.A.; Miss Anna Fillmore, National League for Nursing; Miss Pearl Bierman, A.P.W.A.; Leona Baumgartner, A.P.H.A.; George Bugbee, secretary of the Committee and president of the Health Information Foundation; and Harold Hillenbrand, A.D.A.

Executives of some 30 national organizations in the health field who met in the Central Office of the American Dental Association February 20, under the auspices of the National Health Council, are pictured above. Philip E. Ryan (standing, at far left) is executive director of the National Health Council. Harold Hillenbrand, secretary of the American Dental Association, is standing next to Mr. Ryan. Dean W. Roberts, M.D., represented the National Society for Crippled Children and Adults and presided at the meeting. He is seated at the head of the table at left

several guests were heard. Maj. Gen. Dan C. Ogle, surgeon general of the Air Force, spoke on developments in aviation, ballistics and the health field. Gunnar Gunderson, M.D., president-elect, American Medical Association, discussed Russian medicine at a dinner meeting of the group, and James A. Shannon, M.D., director, National Institutes of Health, reported on medical research today.

Harold Hillenbrand, American Dental Association secretary, presided, and Dr. Shailer Peterson, secretary of the Council on Dental Education, and Dr. J. Roy Doty, secretary of the Council on Dental Research, gave reports to the committee.

APPLICATIONS FOR LIFE MEMBERSHIP DUE BY JUNE 30

Association members who are eligible to apply for life membership in the American Dental Association should keep in mind that the deadline for applications to be considered during the current year, as stated in the Bylaws, is June 30, Louis M. Cruttenden, assistant secretary, said.

Members must be 65 years of age and have belonged to the Association for 35 years to be eligible for life membership. Years of membership need not be consecutive, but applicants must be members in good standing of the Association.

APPLICATIONS INVITED FOR EXHIBITS AT ANNUAL SESSION

Members of the American Dental Association who wish to present scientific exhibits at the Association's 99th annual meeting in Dallas November 10-13 may obtain application forms from the Council on Scientific Session at the Central Office.

Exhibits should be concerned with diagnosis, treatment or research related to dentistry or to improvement of general health. Exhibits with some amount of demonstration are particularly desirable, according to the chairman of the Council, David J. Fitzgibbon, Washington, D. C.

The deadline for applications will be July 1, so that exhibits may be listed in the preliminary program of the annual session.

SPEAKERS ANNOUNCED FOR DENTAL HEALTH CONFERENCE

Speakers have been announced for the Ninth National Dental Health Conference to be held at the Association's Central Office in Chicago April 28-30.

On the morning of April 28, Mr. Robert L. Jorgensen, who is with a firm of management consultants in Chicago, will speak on "Basic Elements of Dental Practice Administration: A Management Engineering Analysis." Four talks on particular factors in the determination of dental fees will follow. Speakers on these topics will be announced later.

In the afternoon, the state dental health program and its development through cooperation of the state dental division and the dental society will be the general topic. Mr. Bernard J. Conway, secretary of the Council on Legislation, will speak on justifying the program to congress and state legislatures. The use of the survey and cost estimate form developed by the Council on Dental Health and the American Association of Public Health Dentists will be discussed by David B. Ast, dental director with the New York Department of Health, and Lynn Temple, chairman of the council on dental health of the Missouri State Dental Association.

Under the general topic of government programs for dental care, John M. Frankel, acting dental director of the Missouri State Health Department and a member of the U. S. Public Health Service, will discuss public assistance programs. Rudolph H. Friedrich, secretary of the Council on Dental Health, will review the Medicare program, and Mr. Hal

Christensen, assistant secretary of the Council on Legislation, will discuss legal problems in financing health programs for the aging under Old Age and Survivors Insurance (Forand bill).

Workshop sessions will be held on April 29, with the groups presenting their reports on April 30.

MACGREGOR, BRITISH DENTAL DEAN, SPEAKS TO A.D.A. STAFF

Alexander B. MacGregor, dean of the dental school at the University of Birmingham, England, addressed the staff of the American Dental Association in the Central Office March 17.

Also, the choral group, made up of Association employees, sang at the meeting.

Dr. MacGregor has spoken at several dental schools and attended the annual meeting of the International Association for Dental Research in Detroit in March.

ABOUT 4,800 REGISTER FOR NATIONAL BOARD EXAMS

Approximately 4,800 persons registered for the National Board examinations, which were given March 31 and April 1, said Gerard J. Casey, secretary of the Council of the National Board of Dental Examiners.

Thirty-one states, two dependencies and three federal dental services accept the scores and certificates of the National Board. Results of the examinations will be available after May 20.

SCIENCE FAIR PACKET DISTRIBUTED BY BUREAU

A packet of materials on science fairs has been distributed to presidents and secretaries of all constituent and component societies by the Bureau of Public Information.

The House of Delegates urged dental societies to support the science fair movement in a resolution adopted at the 1957 annual meeting held in Miami, Fla.

The packet contains a letter from William R. Alstadt, Association president, urging support of science fairs. The letter said in part:

> In the growing competition for scientific minds, dentistry cannot afford to be left behind.
>
> By taking an active part in the science fair movement you will be doing a service for youth, science and your profession.

Materials included lists of possible projects related to dentistry and an outline of ways societies can participate in promoting science fairs.

COUNCIL ASKS FOR SPECIMENS OF LABORATORY ADVERTISING

The Council on Dental Trade and Laboratory Relations is continuing its study of the advertising practices of certain dental laboratories and mail order denture firms, according to Bernard J. Beazley, secretary of the Council. Dentists are asked to clip and send to the Council any advertisements which they may see in newspapers or magazines.

The source from which the clippings are taken should be indicated and the date of publication. All clippings should be sent to the secretary of the Council on Dental Trade and Laboratory Relations at the Central Office of the American Dental Association, 222 E. Superior St., Chicago 11.

BUREAU ISSUES PAMPHLET ON PRESCHOOL DENTAL NEEDS

A new pamphlet, *Healthy Teeth . . . A Happier School Child,* has been issued by the Bureau of Dental Health Education in cooperation with the American Society of Dentistry for Children, according to Perry J. Sandell, director of the Bureau.

The illustrated, two-fold leaflet stresses the importance of diet, toothbrushing and early dental care to the dental health of the child. It is designed for parents of

Admiring the mahogany barometer presented to the Norway National Bank are (l. to r.) Fred E. Smith, vice-president and trust officer of the bank, and Arthur M. Easton, First District trustee of the American Dental Association and president of the bank since its organization 25 years ago. The gift was presented by the Merchants National Bank of Boston in recognition of 25 years of business relations with the Norway bank.

children who are about to enter school and for use by P.T.A. groups during preschool conferences. It would also be useful to the dentist in informing parents of young children of dental needs.

The pamphlet is priced at 65 cents for 25, $1.25 for 50, $2.25 for 100 and $10 for 500. It is available from the Order Department, American Dental Association, 222 E. Superior St., Chicago 11.

HILL, DEAN APPOINTED TO COMMITTEE ON AGING

Thomas J. Hill, chairman of the Council on Dental Research, and H. Trendley Dean, secretary of the Council, have been appointed dental representatives on the project committee of the National Committee on Aging of the National Social Welfare Assembly.

They will advise during a two year study of the utilization of older scientific and professional workers.

44 GROUPS EXCEED GOALS IN RELIEF FUND DRIVE

Contributions during the current Relief Fund Drive totaled $114,927.52 on March 7. The goal for the drive was $100,000.

Forty-three constituent societies and one federal dental service have exceeded their individual goals on this date. Tennessee led all constituents by having contributed 315.6 per cent of its current goal. The Public Health Service was the only federal dental service to have reached or exceeded its goal.

F.D.I. MEMBERS AID INTERNATIONAL RELATIONS

Obed H. Moen, chairman of the Council on International Relations of the Association and U. S. treasurer for the Fédération Dentaire Internationale, has cited membership in the F.D.I. as a means whereby dentists can support President Eisenhower's "people-to-peo-

ple" program, which is designed to foster friendly relations between people of the United States and those of other nations. The President's plan has received the endorsement of the House of Delegates of the American Dental Association.

Annual dues for supporting membership in the F.D.I. are $15. Supporting members receive the *International Dental Journal,* the *F.D.I. News Letter* and other benefits.

Applications for membership with a check covering the dues may be sent to Dr. Moen, 6 Main St., Watertown, Wis.

Dental Societies

INDIANA ASSOCIATION CELEBRATES CENTENNIAL

On December 28, 1858, 15 Indiana dentists met at Indianapolis and organized the Indiana State Dental Association. In commemoration of this event, special centennial programs will be presented at the annual meeting of the Indiana association May 18-21 in Indianapolis, according to Maynard K. Hine, president of the organization.

Beginning with a Sunday afternoon symposium on high speed technics and ending four days later with a session devoted to "Changing Concepts in Dental Materials and Technics," the annual meeting will be filled with scientific programs, several centennial ceremonies and social events.

William R. Alstadt, president of the American Dental Association; Harold Hillenbrand, secretary of the A.D.A.; and Leroy E. Burney, M.D., surgeon general of the U. S. Public Health Serv-

Insertion of x-ray filters provided in instruction folder issued by the Southern Maryland Dental Society is discussed by (l. to r.) Robert J. Nelsen, Association representative to National Committee on Radiation Protection, who designed the folder; Darwin R. Drewyer, society president; George B. Clendenin, Maryland State Board of Dental Examiners; and Dr. Scott W. Smith, chief, x-ray equipment section, National Bureau of Standards, and also a member of the national committee. Radiation programs are also discussed on pages 580 and 581 of this issue.

ice, will be among the guests participating in the centennial ceremonies.

Charles L. Howell is chairman of the centennial committee, and Joseph E. Morris is program director for the annual meeting.

A.D.A. PRESIDENT TO SPEAK AT MICHIGAN ANNUAL MEETING

William R. Alstadt, American Dental Association president, will speak at the annual meeting of the Michigan State Dental Association to be held April 28-30 in Detroit.

Essays, limited attendance clinics and table clinics will be given on all three days of the meeting.

The outstanding social event of the association's 101st annual meeting will be the president's banquet and ball on the evening of April 29. The event will honor F. D. Ostrander, Michigan association president.

International

NEW AUSTRIAN JOURNAL BEGINS PUBLICATION

A new Austrian dental journal, *Österreichische Zahnärzte-Zeitung*, began publication January 1, with Wilhelm Brenner as editor. The journal succeeded the *Mitteilungen de Bundesfachgruppe für Zahnheilkunde* (Communications of the Austrian Chamber for Dentistry). The editorial office is at Weihburggasse 10-12, Vienna 1.

10TH ANNIVERSARY OF W.H.O. TO BE OBSERVED APRIL 7

On April 7, World Health Day, the World Health Organization will observe the tenth anniversary of the day its constitution came into force.

In connection with the occasion, W.H.O. is calling attention to the advances made in health during the past decade.

Obed H. Moen, chairman of the Association Council on International Relations, said that the dental health program of W.H.O. is of "inestimable value to the dental profession in its efforts to bring about increased public awareness of dental health." He urged national agencies to increase the utilization of the services available through the Organization.

W.H.O. was the outgrowth of an international health conference which was held in New York in 1946. Sixty-one governments participated in the conference and declared that low health standards anywhere in the world were a common danger and that health consequently is a world concern and not simply a national concern.

Eighty-eight nations are now members of W.H.O.

A.D.A. PRESIDENT VISITS CITIES IN FAR EAST

William R. Alstadt, Association president, planned to visit Hong Kong and Tokyo after attending the Second Asian Dental Congress and Asian-Pacific Dental Conference in Manila March 24-30 as the representative of the American Dental Association and the Fédération Dentaire Internationale. Dr. Alstadt spoke to the Congress.

He also attended a meeting of the Honolulu County Dental Society March 18.

DENTAL FEE SCHEDULE IN AUSTRIA ANNOUNCED

The January 1, 1958, schedule of all dental fees under the socialized health insurance program in Austria was given in an editorial in the January issue of the Austrian dental journal, *Österreichische Zahnärzte-Zeitung*.

Some of the fees in terms of American currency were as follows: consultation, 59 cents; oral examination and diagnosis, $1.76; removal of a single tooth, 90 cents; local anesthesia, including injection, 68 cents; general anesthesia, including injection, 80 cents; filling, one surface cavity, $1.50; filling, three surface cavity, $4.21; silicate cement filling, $1.45, and pulp extirpation and filling of one root, $4.82.

The charge for the first dental roentgenogram is $1.23, and for each additional roentgenogram the fee is 82 cents. The charge for alveolectomy per quadrant was given as $1.70.

For a complete acrylic base denture the fee is $12; for each tooth, $2, and for each clasp, $2. The charge for complete relining of a complete upper or lower denture under the program was given as $10.

Dental Education

CHICAGO COLLEGE MARKS 75TH YEAR, ANNOUNCES NEW SITE

Chicago College of Dental Surgery, now the dental school of Loyola University, is celebrating the 75th anniversary of its founding this year. In connection with the observance, a three-day homecoming program will be given April 14-16. Also, the announcement was made that the school has been allocated eight acres in the expanded Chicago medical center by an Illinois state commission.

The first day of the homecoming program will be "Student A.D.A. Day" and will feature essays and table clinics by students. The next two days will be devoted to a scientific program given by faculty members. The observance will be climaxed on the night of April 16 by a banquet at which Harold Hillenbrand, Association secretary and an alumnus of the school, will speak.

Plans have been made to use the area allocated by the Illinois State Medical Center Commission as the site of a 4 million dollar plant containing a new dental school and student housing facilities, William P. Schoen, dean of the school, announced in late February.

Construction probably will be started in about three years, he said. The new building would accommodate over 600 students. Plans also are being made for new departments for training dental hygienists and dental assistants.

The school was founded in 1883 and is the oldest dental school in Illinois.

DENTAL TRADE MEMORIAL FUND TO AID DENTAL STUDENTS

The American Dental Trade Association has established a living memorial fund through which members of the association can make contributions to the Fund for Dental Education in memory of deceased dentists, members of the trade or friends.

Contributions will be used for grants and scholarships to dental students. The fund will be administered through the office of the American Dental Trade Association in Washington, D. C.

The trade association also contributes to dental education through a loan fund for senior dental students and a fellowship for graduate study in dentistry.

BERRY BROWN, EMORY PROFESSOR, IS HONORED

L. Berry Brown, Emory University dental professor, was honored by his former students at a dinner March 16 in Atlanta, Ga.

Dr. Brown retired as chairman of the

department of prosthetic dentistry and as director of dental clinics last spring, but he is serving as acting chairman of the department during the current school year. He is the only full-time faculty member who also taught at Atlanta-Southern Dental College before it became a part of the university in 1944.

A native of Mississippi, Dr. Brown received his dental degree from Vanderbilt University in 1912. He is a former president of Omicron Kappa Upsilon, dental honor society.

MARQUETTE TO DEDICATE NEW DENTAL WING APRIL 20

A new $800,000 dental wing will be dedicated at a program at Marquette University, Milwaukee, April 20. The program will precede the annual meeting of the Wisconsin State Dental Association April 21-23.

Harold W. Oppice, chairman of the Association Council on Dental Education, will give a short address. Other speakers will include Father O'Donnell, president of the university, and Archbishop Meyer of the archdiocese of Milwaukee. After the dedication of the building, the program will be concluded with a luncheon. O. M. Dresen is dean of the dental school.

The facilities in the new wing have been in use since late February. The wing completes the four story medico-dental quadrangle started in 1932.

The addition features a 26 chair pedodontics clinic, with four more chairs in soundproof side rooms; a large prosthetics department, and an oral surgery demonstration room, from which closed circuit telecasts may originate. Other facilities include offices, laboratories and a large lecture room with tiered seats.

CLEVELAND HOSPITAL OFFERS ORAL SURGERY PROGRAMS

An internship and a residency in oral surgery for 1958-1959 beginning July 1 are available at St. Vincent Charity Hospital in Cleveland.

The programs in the 350 bed institution are being considered for approval by the Council on Dental Education.

Further information can be obtained from the oral surgery department of the hospital, E. 22nd St. and Central Ave., Cleveland.

New dental wing at Marquette University

TWO ROTATING INTERNSHIPS AVAILABLE AT V.A. HOSPITAL

Two rotating one year dental internships beginning July 1 are available at the Veterans Administration Hospital, New Orleans.

Instruction under university sponsorship is conducted by both full-time and consulting personnel. The internships are being considered for approval by the Council on Dental Education of the American Dental Association.

Application forms and further information may be obtained from W. R. Dixon, chief of the dental service at the hospital, 1601 Perdido St., New Orleans.

DENTAL SCHOOLS ANNOUNCE REFRESHER COURSE SCHEDULES

California • The University of California School of Dentistry, San Francisco, will present a course on "Functional Anatomy and Pathology of the Mandibular Joint and Problems of Pain in Dentistry" May 8-10. Dr. Harry Sicher of Chicago will teach the three day course for general practitioners and specialists. The fee for the course is $75, and the enrollment closes April 30.

A postgraduate course in "Dental Medicine: Dynamics of Diagnosis and Treatment" will be presented May 23 and 24. The faculty will be composed of teachers from the dental school. The course is designed to assist the practicing dentist in patient evaluation and treatment. The fee is $50, and attendance is limited.

Further information can be obtained from the director of postgraduate education at the school, Third and Parnassus Aves., San Francisco 22.

Minnesota • The University of Minnesota School of Dentistry will present a course in advanced oral pathology April 28 through May 2. The course will give special attention to tumors of the oral regions and pathological lesions caused by radiation. The fee for the course is $50.

Further information can be obtained from Robert J. Gorlin, chairman of the oral pathology department at the dental school.

Ohio • Ohio State University College of Dentistry has announced the scheduling of several postgraduate refresher courses. The courses are in general anesthesia, April 28 through May 2; periodontics, May 5-9; clinical dentistry, May 12-16; and pharmacology, May 19-23.

Pennsylvania • Several postgraduate refresher courses will be given by the Thomas W. Evans Museum and Dental Institute of the University of Pennsylvania.

M. M. DeVan will conduct a course for the general practitioner in complete denture prosthesis April 7-11. The fee is $150. Endodontics will be the subject of an 11 day course April 14-25. The course will be under the direction of Louis I. Grossman. The fee is $275. Leonard Hirschfeld will teach a course in "Minor Tooth Movement and Temporary Stabilization" April 16-18. The fee for the course is $100.

A refresher course in periodontal therapy under the direction of Henry M. Goldman and D. Walter Cohen will be given on April 19. The course is a review for persons who have taken a postgraduate course in the subject at the university or at Beth Israel Hospital in Boston. The $15 fee includes luncheon.

Included on the schedule for May is a course on complete denture prosthesis conducted by H. Milton Rode May 5-9. The fee for the course is $150, and it is designed for the general practitioner.

Tufts • The division of graduate and postgraduate studies of Tufts University School of Dental Medicine will conduct the Ninth Annual Berkshire Conference in Oral Pathology and Periodontology in Lenox, Mass., June 15-19.

The conference will consist of four days of lectures, seminars and panel discussions on the general theme of "Gerodontics—Oral Problems Associated with Aging."

The curriculum is arranged so that the mornings and evenings are devoted to professional activities with afternoons open for recreation. The conference is for general practitioners as well as for those interested in specialized practice.

Further information can be obtained from the school, 136 Harrison Ave., Boston 11.

Washington • The University of Washington School of Dentistry, Seattle, in cooperation with the dental health section of the Washington State Department of Health will present a special series of lectures on recent advances in research on caries and periodontal disease. The lectures will be given April 18 by Dr. Leonard S. Fosdick. The attendance fee is $5.

A refresher course on "Technical and Biological Considerations of Modern Crown and Bridgework" will be taught May 5 and 6 by Robert E. Willey. The enrollment is not limited because closed circuit television will be used. Tuition is $80.

Lectures and a symposium on "Analysis and Treatment of Adult Dental Occlusion" will be given May 22-24. Henry L. Beyron of Stockholm, Sweden, will be assisted in conducting the course by faculty members of the school. The fee will be $75.

The School of Dentistry will also present its Sixth Annual Roentgenology Workshop June 21 and 22. The theme will be "Radiation Hazards and Their Control."

Further information can be obtained from the department of postgraduate dental education at the school.

Research

A.D.A. RESEARCH ASSOCIATE RECEIVES TRAVEL AWARD

John E. Folk, Ph.D., research associate with the American Dental Association Research Division at the National Institute of Dental Research, Bethesda, Md., is the recipient of a $600 travel award from the American Society of Biological Chemists and the division of biological chemistry of the American Chemical Society.

The award is for Dr. Folk's attendance at the International Biochemical Congress to be held in Vienna in September. Dr. Folk plans to present several papers at the Congress. He is recognized for his work on enzymes.

DENTAL RESEARCH GROUP HOLDS ANNUAL MEETING

Several hundred reports on experiments relating to oral health were presented at the 36th annual meeting of the International Association for Dental Research. The meeting was held March 20-23 in Detroit.

On March 23 the research group held a joint meeting with the American Association of Dental Schools. The theme of the program was the "Interrelationship between Research and Education in Modern Dentistry." Reidar F. Sognnaes, president of the International Association for Dental Research, was moderator, and Roy G. Ellis, president of the American Association of Dental Schools, presided at the joint meeting.

Ned B. Williams, professor of microbiology at the Thomas E. Evans Museum and Dental Institute of the University of Pennsylvania, succeeded Dr. Sognnaes as president of the international group.

Alexander B. MacGregor, professor of dental surgery and director of dental studies at the University of Birmingham, England, represented the British division.

SWEENEY GIVEN AWARD BY COMMERCE DEPARTMENT

William T. Sweeney, chief of the dental research section, National Bureau of Standards, was the recipient of a meritorious service award at the tenth annual honor awards program of the U. S. Department of Commerce held in Washington, D. C., in February.

William T. Sweeney

Mr. Sweeney was cited "for outstanding contributions to the science of dental materials, for noteworthy dental research and for highly distinguished authorship." Secretary of Commerce Sinclair Weeks gave an address at the awards program.

General

MONTREAL TO BE SITE OF DENTAL MEDICINE MEETING

The American Academy of Dental Medicine will hold its 12th annual meeting in Montreal, Canada May 29-31.

The scientific program will concern the interrelationship of oral medicine and general medicine, with topics including "The Dentist and the Endocrine Problem," "The Internist," "The Obstetrician," "The Pharmacologist," "Inflammatory Diseases of the Mucous Membranes of the Mouth" and "Contact Dermatitis of the Face and Hands."

A special feature of the program will be a discussion of the over-all treatment and rehabilitation of the cleft palate patient by staff members of the Montreal Children's Hospital.

All members and interested dentists and physicians are invited. For programs and reservations contact George Witkin, 45 S. Broadway, Yonkers 2, N. Y.

TECHNICIANS CERTIFICATION BOARD HOLDS FIRST MEETING

The first meeting of the agency which will develop the administrative procedures for carrying out the recently approved certification program for dental laboratory technicians met in Washington, D. C., February 22 and 23.

A draft of the proposed bylaws developed at the meeting will be presented to the Council on Dental Education of the American Dental Association for evaluation and approval at its meeting at the Central Office in May. The proposed bylaws will also be considered by the Executive Council of the National Association of Dental Laboratories.

Dr. Shailer Peterson, secretary of the Council on Dental Education of the American Dental Association; Mr. Reginald H. Sullens, associate secretary of the Council, and Mr. Bernard J. Beazley, secretary of the Council on Dental Trade and Laboratory Relations of the American Dental Association, attended the meeting.

Dental laboratory owners who serve on the certification board include Horace Denner of Los Angeles, Joseph Deurmyer of Topeka, Kan., Joseph Kennedy of Chicago, George Klein of New York, Einar Lignell of Salt Lake City, Alfred Stern of Houston and G. Paul Stough of Cleveland.

GENERAL DENTISTRY ACADEMY HOLDS ANNUAL MEETING

The Academy of General Dentistry awarded honorary certificates to five dentists at the group's annual meeting in Chicago in February.

Among those honored was Harry Lyons, immediate past-president of the American Dental Association and dean of the School of Dentistry, Medical College of Virginia. Others were Saul Levy, head of the dental department, Michael Reese Hospital, Chicago; Edward J. Ryan, editor of *Oral Hygiene;* William P. Schoen, dean of Chicago College of Dental Surgery of Loyola University; and William F. Swanson, dean of the School of Dentistry, University of Pittsburgh.

The new officers of the newly formed Chicago group of the Academy include, J. J. Applebaum, president; Edward Berens, vice-president; Ulysses Argianas, secretary; and Alfred D. Kamin, treasurer.

STEWART INSTALLED AS PRESIDENT OF ENDODONTISTS

The new officers installed at the annual meeting of the American Association of Endodontists in February included George Stewart of Philadelphia, president; J. Henry Kaiser of Columbus,

Ohio, president-elect; Paul P. Sherwood of Cleveland, vice-president; and James H. Sherard, Jr., of Atlanta, Ga., treasurer. Victor H. Dietz of St. Louis continued as editor.

EDWIN N. COOPER, CONTRIBUTOR TO DENTISTRY, DIES

Edwin N. Cooper, who, despite severe physical handicaps, contributed to dentistry through his work in physics, died in late January. He was in his late fifties.

Mr. Cooper, a native of Chicago, had been affected by a rare bone disease from birth and sustained approximately 65 fractures of the long bones before the age of 15. He was unable to walk until 14. His full height was 4 feet, 3 inches.

Mr. Cooper, a graduate of the University of Chicago, served on the physics staff of Northwestern University Dental School from 1942 to 1955.

In 1955, he became active in the rehabilitation of the handicapped, serving as vocational rehabilitation counselor in Lake County, Illinois. In 1957, he became executive director of the Sterling-Rock Falls Prosthetics and Rehabilitation Center in Rock Falls, Ill.

Mr. Cooper was a member of the International Association for Dental Research, the American Physical Society and Sigma Xi, science honorary society.

TECHNICIANS BILL INTRODUCED IN BRITISH COLUMBIA

A bill to create a licensing board for dental laboratory technicians and to allow licensed technicians to take impressions for and sell dentures directly to the public was introduced in the legislature of British Columbia by the minister of health of the Canadian province.

The bill provides for a five member board to regulate and license dental technicians who wish to deal directly with the public. The board personnel would be selected by the government, and cabinet approval would be required before regulations recommended by the board would be valid. The board would be empowered to establish a register of qualified dental technicians.

The bill is supported by the British Columbia Dental Technicians Society and the Dental Technicians Union, a labor organization. However, the opposition of the British Columbia Dental Laboratory Association, members of which deal only with dentists, was expressed by the group's president, John Crompton. He said, "We're certainly not dentists, just bench men who are not qualified to enter a person's mouth. I'm doubtful whether it's in the public interest."

The president of the British Columbia College of Dental Surgeons, C. M. Whitworth, said:

> A hasty examination of the act shows features that have been previously tried with disastrous results and later discarded in other countries . . . it contains the possibility of debasing our dental health standards to such an extent that they would be lower than in any other province, and behind most countries in the world.

The executive secretary of the British Columbia Dental Association denied charges made by the Dental Technicians Union that the association was "grabbing" profits from dentures that should rightfully go to the dental technicians and said that the controversy was caused by a small number of dental technicians.

ACADEMY OF ANESTHESIOLOGY TO MEET IN PHILADELPHIA

The International Academy of Anesthesiology will meet April 23 in the Cheltenham Professional building in Philadelphia. Three essays and a film will be presented.

The Academy is concerned with anesthesiology for the ambulatory dental and medical patient. Irwin G. Tomack of New York is secretary of the Academy.

INJUNCTION ISSUED IN ILLEGAL PRACTICE SUIT

The Superior Court in Rhode Island granted an injunction February 28 restraining Clifford A. Primeau, an operator of dental laboratories in Pawtucket and West Warwick, R. I., from the illegal practice of dentistry as the result of a suit brought by the State Board of Dental Examiners.

Primeau advertised his laboratories in newspapers and telephone directories.

Part of the opinion issued by Judge G. Fredrick Frost was as follows:

> The evidence before the Court is that the two patients who visited the Primeau Dental Laboratories were fitted with dentures by licensed dentists. There is no direct evidence before the Court that Primeau himself worked upon the mouth of any patient and personally fitted any dentures. The method pursued appears to have been to advertise to the general public; that when individuals who had read the ads visited one of the Primeau Dental Laboratories such individuals would be met by a licensed dentist by whom the examination of the mouth would be made. When patients came in they came into a room which was designated Primeau Dental Laboratory. The evidence shows that no price for a given piece of work was given until the attending dentist had left the room and returned. The dentists were on party lines with the dental laboratory. The offices were adjacent. In this case patients' checks payable to Primeau Dental Laboratory were received with, in one case, mild astonishment, but they were accepted. Primeau was the person who directed everything that was done. In reality he, a person not licensed to practice dentistry, was through others actually practicing dentistry. That he could not do legally.

MEDICAL ASSOCIATION PLANS TWO NEW PUBLICATIONS

The American Medical Association has announced that plans are being made to issue two new publications—a tabloid-size newspaper to be sent every two weeks to about 200,000 physicians and a magazine for the association's employees.

The newspaper, *The A.M.A. News*, is designed to report activities of the association and those of state and county medical societies. The publication has been authorized by the A.M.A. Board of Trustees and will carry advertising. The first issue is expected to be published in conjunction with the group's annual meeting, to be held June 23-27 in San Francisco.

The employee magazine will be named through a contest among employees. A forerunner, *535 in Transition*, is currently being issued.

The plans were announced by F. J. L. Blasingame, M.D., who became general manager of the A.M.A. on January 1.

NATIONAL GROUP TO STUDY LAWS AFFECTING RESEARCH

A program to modernize outmoded state laws affecting such matters as the desire of people to will parts of their bodies for use as transplants, the development of new drugs and therapies and experimentation with humans and animals has been undertaken by the National Society for Medical Research.

The Society plans to call a conference of leaders in the science fields to recommend a uniform act for submission to the National Conference of Commissioners on Uniform State Laws and eventually to state legislatures. A preliminary survey on existing laws has been completed by a committee of the Society.

Dr. Lester Dragstedt, president of the Society, announced the plans at the group's annual meeting in Chicago in February. Lon W. Morrey, Association editor, serves on the Society's Board of Directors.

FIRST EDMUND NOYES LECTURE TO BE GIVEN BY HAROLD NOYES

The first Edmund Noyes memorial lecture will be given by Northwestern University Dental School April 23. Harold J. Noyes, dean of the University of Oregon School of Dentistry and grand-

son of the man for whom the annual lectures have been named, will speak on "Some Clinical Aspects of Facial Growth."

Edmund Noyes was one of the founders of Northwestern University Dental School and served on the faculty from 1890 until his death in 1927.

The lecture will be open to the dental profession without charge.

ORAL SURGERY SOCIETY SETS MAY MEETING DATE

The Middle Atlantic Society of Oral Surgeons will meet May 21 at the Lord Baltimore hotel, Baltimore.

The program will consist of a talk on diagnosis and treatment planning for the cleft lip and cleft palate patient by Herbert Cooper, founder and director of the Lancaster, Pa., Cleft Palate Clinic; a film on new methods of resuscitation, and a lecture on neuralgia of the face and head.

Lloyd E. Church is president of the Society.

CORRECTIONS

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Walter S. Weisz, recipient of the research award of the Chicago Dental Society, practices pedodontics in Pittsburgh. The wrong city was given in the story on page 414 of the March issue of THE JOURNAL.

Also • A reunion for alumni of Temple University School of Dentistry will be held April 30 at the Drake hotel in Philadelphia. . . . The Dean's Day, the homecoming program at New York University College of Dentistry, is also scheduled for April A luncheon will be given for Raymond Nagle, dean, as part of the homecoming program at the college on April 18. . . . The St. Louis Dental Society is sponsoring a series of six lectures for dentists on KETC-TV. The programs which started in March and will continue through May are given every two weeks. . . . Two groups of dental assistants will meet in May. The Dental Assistants Society of the First District of New York will meet May 16 in the Statler hotel for the election of officers. The Colorado State Dental Assistants Association will hold a certification examination May 3 at the Denver General Hospital. . . . The trustees of the College of Medical Evangelists, Loma Linda, Calif., have approved a two year course for dental hygienists in the School of Dentistry. The beginning date of the course will be announced later, according to M. Webster Prince, dean of the School of Dentistry. . . . W. Arthur George has been appointed full professor and head of the prosthodontics department at the University of Pittsburgh School of Dentistry. He has been an assistant professor at the school since 1947.

International Correspondence

NEWS FROM AUSTRALIA

The Commonwealth of Australia, through its department of health, controls all health services in the Northern Territory, including dental service. Because of the extensive area of the territory, the geographical distribution of the population and the climatic conditions, the health program is an interesting subject.

Characteristics of the Territory • The Northern Territory has an area of 500,000 square miles and occupies one sixth of the total area of Australia. It is the least developed part of the continent and has a population of 33,000. About half of the inhabitants are non-aborigines, the majority of whom live in the towns, so that the territory is characterized by sparsity of population in the "outback" areas.

The main occupation of the inhabitants for many years has been the raising of beef cattle, but within the last four or five years, mining has become an important industry, mainly due to the finding of rich uranium deposits. In 1955 rice growing was introduced, and this may ultimately be the largest single agricultural undertaking in Australia. The expansion of these various industries has brought with it a public health challenge and a problem of expansion of medical services.

The climatic conditions vary from the moist tropics of the coastal area in the north to the desert in the west. In the east is the Barkly Tableland, which is some of Australia's best pasture land. In the south are hills and low mountains. The summers are hot and dry and the winters are keen in the "Center," as it is called.

The main population centers are Darwin, Batchelor, Katherine, Tennant Creek and Alice Springs. These towns are connected by a good asphalt highway, covering 1,000 miles from Darwin to Alice Springs. Darwin, the capital, has an estimated population of 10,000 and is the territory's only port.

General Health Services • The general health in the towns is good, and there has been little spread of tropical diseases in these population centers. Batchelor has a small hospital. The other four centers have well-equipped general hospitals, and each of these hospitals provides services for settlements as far away as 150 miles. In this way, weekly visits can be made for such services as prenatal care for expectant mothers and the immunization of children against such diseases as diphtheria, whooping cough, tetanus and poliomyelitis.

A Commonwealth health laboratory situated at Darwin provides various services, particularly in relation to native illnesses and surveys of native health, and assists the coroner and the police. An important service, particularly for the aborigines, is provided by the leprosarium on the east arm of Darwin harbor. This leprosarium is financed by the department of health and is controlled by the medical superintendent. The staff is provided by the religious Order of Our Lady of the Sacred Heart.

Apart from the hospitals, the health service is supplied by the aerial medical service, school medical service and the dental service. The aerial service is based on Darwin and Alice Springs, and it also maintains a close cooperation with the Royal Flying Doctor Service, which was inaugurated by the late Reverend Dr. John Flynn, who established this form of service for the "outback" areas and based it on Alice Springs.

In addition to the various services mentioned, a quarantine service is maintained at Darwin, which is one of the chief ports of entry for overseas aircraft. This work is of great importance since all aircraft have passed through Middle Eastern or Asian countries and may carry diseases such as smallpox, cholera and bubonic plague.

The health services employ a staff of almost 400, including 22 physicians, 9 dentists, 118 nurses, 82 administrative employees and a technical staff. Salaries for medical and dental officers are in the range of 2,383 to 2,713 and 1,888 to 2,053 Australian pounds respectively, with recreation leave ranging from 28 to 36 days per year depending on the location.

Dental Service • Dental service is provided by a staff of nine dentists, two receptionists, seven dental nurses and six technicians. The senior dental officer is under the director of health and is responsible for the implementation of policy and for the organization of the service. As well as general treatment, service includes orthodontics, crown and bridge work and treatment of fractured jaws. Permanent dental clinics are in operation at Darwin, Batchelor and Alice Springs. In addition, children attending school in Darwin and Alice

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Springs are treated in special school clinics, and, for the distant population, mobile units travel by aircraft, motor van and boat.

The dental equipment is modern and extensive, and every endeavor is made to maintain a full range of instruments, materials and equipment both for the permanent clinics and for the mobile units, so that the people in the outlying settlements will have the same dental treatment available as those living in the main centers.

The motor vans travel the main, 1,000 mile highway running from Darwin to Alice Springs. Larger towns are serviced from the highway. Each town along the route is visited once every four months. Large settlements such as Tennant Creek (population, 1,500) has a dentist working five months of the year. From Alice Springs a mobile unit undertakes excursions to native reservations and settlements three times a year during school vacations.

Three main routes are covered by the aerial dental unit—one to the Kimberleys in the west, one to the Roper river area in the northwest and a third route to cover the mission stations. At the present time an aircraft is made available to the dental service during the first week in each month. A dentist and a technician travel these three routes, each area being visited four times a year. The technician also acts as a dental nurse.

On demand a dentist visits Cape Don lighthouse, but the service depends on the sailing schedules of the launch service between the lighthouse and Darwin. Dental treatment is also extended to patients in hospitals and to those living at the leprosarium.

Preschool and school dental service are available in Darwin. Each dentist serves in the infant school clinic for four months every year. At present only preschool and infant school children, approximately 650, are given regular routine treatment every year. Children from primary and secondary schools and from denominational schools are given routine treatment at longer intervals, but emergency treatment is available for them at the main clinic in Darwin. There has been 92 per cent acceptance from children in the two groups, and the teaching staff fully cooperates. With the keeping of adequate records of dental caries pattern and treatment, the department of health has a complete picture of the dental problems in this segment of the population.

The people of Darwin have the services of two private practitioners supplementing the work of the department of health.

Robert Harris, M.D.S.

NEWS FROM GREAT BRITAIN

On Tuesday, February 25, H. R. H. Prince Philip, the Duke of Edinburgh, received his certificate of honorary membership in the British Dental Association in a most impressive ceremony at 13 Hill Street, the association headquarters.

In order to ensure that representatives from all parts of the United Kingdom were present on what was a most historic occasion, only presidents of branches and members of the Representative Board were given the opportunity of attending the ceremony.

The 1958 annual conference is planned to be held in Dundee, Scotland, July 7 to 12. The president-elect is W. R. Tattersall. A provisional program indicates that this will be a splendid meeting both scientifically and socially. Visiting colleagues from abroad are especially welcome at this meeting.

A new Representative Board consisting of approximately 120 members had its first meeting January 25 and elected William Peebles as their new chairman. The Board then proceeded to elect Lionel Balding its chairman of Council for a further term of office. This certainly must be the most onerous post in the British Dental Association.

In an editorial in the February 4 issue of the *Journal of the British Dental Association* a very interesting history of the association is given under the heading "The Representative Board." The Board has the unusual distinction of being older than the association of which it is a part. The Board, consisting of past and present members of the Executive Council of the Dental Reform Committee, first met in 1879. The association was incorporated in 1880 and held its first annual meeting in 1881.

The work of the association has been linked closely with acts of Parliament. It was formed as a result of the Act of 1878. With the other accredited dental organizations, it represented the profession when the provisions of the Act which established National Health Insurance in 1912 were extended to include dentistry. It became the only recognized organization of the profession when the imminence of the Health Act of 1946 made amalgamation of the three organizations essential, and the way toward amalgamation was prepared by the Register established under the Act of 1921.

NATIONAL HEALTH SERVICE

During and after July 1958 many practitioners will complete ten years' service in the superannuation scheme. If they have also reached the age of 60, they can draw a pension under the scheme. If a practitioner wishes to continue to work in the general dental services once he has started to draw his pension, he is at liberty to do so, but certain rules apply under which the amount of the pension may then be reduced.

The rules set out for the reduction of a pension in certain circumstances do not apply at once to any practitioner who draws his pension for the first time at or after the age of 65. He may draw his pension in full and carry on earning as much as he is able in the National Health Service until he reaches the age of 70. At 70 the ordinary rules for reduction of pension will apply to him if he continues working.

His service after 65, however, cannot go to increase his superannuation benefits, and he will not contribute to the superannuation scheme.

It is anticipated that many practitioners working in the General Dental Service will take advantage of their available pensions and retire from practice after July of this year, intensifying the already serious manpower problem.

"ALL THINGS CONSIDERED"

Edward Samson in his regular article, "All Things Considered," writes in the February 4 issue under the heading "Money and Morals" as follows:

"That we are all in need of a less material conception of our affairs has long been apparent; certainly to religious leaders and to most men of average intelligence. An evaluation of behavior by material standards has also crept into dentistry—an unfortunate fact which does much to damage our ethics.

"Frequently, in quarters both official and unofficial, one hears that a dentist is earning a large income, more especially from the N.H.S. This is always stated to imply that there may be something not quite proper about his methods of practice. If, too, he is suspected of some failure in his ethical or legal conduct, his high earnings are linked by suggestion, with his negligence. Indeed, a large turnover is often, per se, suspect.

"It should be realized that the well-organized, efficiently run practice, capable of treating large numbers efficiently, is often the one providing the greatest service to the community, its principal a man of ability both as an organizer and practitioner. Perhaps it is inevitable that a service controlled, in the ultimate issue, by the Treasury, should be obsessed by cost, that therefore those who earn least are less suspect than those who earn most. Yet withal, it is time we tried to divorce, in our minds, money from morals. Unhappily a large income obtained by effort and brain is frowned upon, while winning a vast sum in a football pool is applauded; the fortunate gambler becoming almost a public figure, while the prosperous dentist is in danger of becoming a public disgrace."

ITEMS OF INTEREST

Royal Air Force • The many friends and colleagues of Air - Vice Marshal Roy Scoggins will want to congratulate him on his appointment as director of the R.A.F. Dental Services, to succeed Air - Vice Marshal M. J. Pigott.

The American Dental Society of London • This group has held two monthly dinners and meetings this year at the Royal College of Surgeons. In January Russell Cole spoke on "Pulp Therapy in Children's Dentistry." In February W. A. Vall gave a most interesting paper on "Cavity Preparation."

Society for the Advancement of Anaesthesia in Dentistry • This new Society, which has had a most successful start, had a preliminary meeting in August 1957 on the occasion of a visit to London by Dr. Harold Krogh of Washington, D. C. Further meetings were held in October 1957 when Dr. W. S. McConnell read a paper entitled "Time and Tranquility: An Anesthetic Ideal" and in November 1957 when a symposium was conducted on "Improving Operative and Anesthetic Procedures in Daily Practice." The membership of this Society is open to physicians and dentists, and details can be obtained from the secretary of the Society, J. F. Mordaunt, 53 Wimpole Street, W.1., London.

Anglo-Continental Dental Society • The Society has a very stimulating program planned for its spring meeting on April 25-27, which includes films on apicectomy and implant dentures and lectures by Prof. Dr. K. Schuchardt of Germany, Dr. S. Richter of Switzerland and Prof. A. S. Prophet and Dr. H. Haber of London.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

THE PATIENT IN THE DENTAL LABORATORY

We have received the information bulletin from the American Dental Association ("The Dentist's Relations with the Laboratory Craft —A Review of His Legal and Ethical Responsibilities," December, 1957). We believe that this idea is a good one, as we have received a number of communications from this Dental Laboratory Association in Chicago. We would like to urge that the first five paragraphs of the bulletin be sent to dentists a number of times, so that we can eliminate patients' coming to the laboratory.

Yesterday we had three patients sent in by dentists. They all had notes, but it just does not look good when a patient takes a denture from his mouth and hands it to the office girl in front of one of our dentist customers. You should know what the reaction of the dentist is.

It is not our place to tell dentists not to send patients to our laboratory. We cannot offend a customer by telling him that he cannot do something. Keep this bulletin going to the dentists from time to time. I am sure it will help solve the problem of patients in the laboratory.

A central Indiana dental laboratory

GOLD FILLINGS AND PREVENTION OF PERIODONTAL DISEASE

Periodontal disease and its relation to the well-being of patients' mouths and to health in general at last has achieved the attention it deserves. Seemingly, this great interest in things periodontal has come about in the last 25 years or so. We have learned to seek out the etiological factors involved and correct them by whatever means are proper. We should recognize, however, that in many instances we ourselves have caused the pathologic conditions. This is true of many of our services, but I shall confine myself to the subject of periodontal conditions in the anterior part of the mouth.

Through errors of omission and commission we have contributed deliberately to the breakdown of gingival tissues in these regions. In some instances, the dentist has not been at fault, patient cooperation and economic factors being what they sometimes are. On the other hand, all too often the patient was never given a choice. Irritated and bleeding gums in the upper anterior regions caused by faulty and sometimes loose silicate fillings are usually accepted in these enlightened times as inevitable. On being questioned, the patient invariably says that no one ever offered him anything better. Of course, there are patients who are adamant in their desire for white fillings and children for whom it would be unwise to condense foil. For these patients, we must use silicate fillings. My argument is that there are many patients we could educate to something better if we would take the time and trouble to do so.

If we would go back to the teachings of G. V. Black, we would find that the concept of the relation of fillings to the periodontium is nothing new. Dr. Black stressed contact, contour and smooth margins and was genuinely concerned about the effect of any filling on the gingival tissues and about permanency. In his day, gold foil was the best material available. Today, when indicated, it is still the best by a wide margin. George Paffenbarger's reports on the physical properties of the various filling materials testify to the truth of this statement. There is no Class III restoration which will encourage normal tone of the gingival tissue by preventing permanently the lodgement of foods better than a well-made gold foil restoration.

For many years in all too many offices, the main consideration seemingly has been esthetics. I, too, believe in esthetics and agree that a flagrant display of gold is repulsive and in

bad taste. However, I also believe that in selected instances gold foil restorations can be placed so as to be unobtrusive and still perform the physiologic function a proper filling is meant to perform.

Every day we see the results of repeated placement of silicate fillings and, worse, their placement without benefit of rubber dam. We see them become wretched, discolored masses and, in a short time, catchalls and holdalls along the overhang on the gingival margin. It is hard to believe that this is modern dentistry. Is it any wonder that so many of our patients at one time or another believe that they will eventually lose all their teeth? Too many people are convinced that they are doomed to dentures because, with a few well-made gold restorations, we did not encourage them to take sufficient pride in their own teeth.

Dr. James Prime in 1936 told us that operative dentistry was failing. His words have been prophetic. However, one bright spot has come into the picture in recent years, namely, the organization called the American Academy of Gold Foil Operators. It is to be hoped that this organization can grow and help restore gold foil and rubber dam to their rightful places in operative dentistry.

The excuses that patients will tolerate neither gold nor rubber dam will not hold water and are usually given to cover up the dentist's own lack of skill or interest or both. How can a patient refuse what has never been offered him? If the service is presented by a man skilled enough, confident enough and enthusiastic enough, a surprising percentage of patients will accept it.

My suggestion for anyone who is interested is to seek out a gold foil study club or to attempt to start one if there are no clubs in the vicinity. A dentist could find that what seemed to be a dreary chore when he was in school can be a rewarding experience. Certainly, he has more background now to be a gold foil operator than when he was a student, and he could be surprised and delighted with the results.

It is a fact that patients who have been educated to accept gold foil restorations like the results and very seldom offer resistance to them thereafter.

Merle B. McGee, D.D.S., Pittsburgh

Six major objectives for the Association during 1958

William R. Alstadt, D.D.S., Little Rock, Ark.

President William R. Alstadt, in a timely and appropriate address to Association Council chairmen at the second Conference of Chairmen and Secretaries held in the Central Office December 16 and 17, 1957, stressed six major objectives which he hoped the Association would attain during the coming year. A portion of Dr. Alstadt's remarks, including his six points, follow:

The world is moving at such a rapid pace today that members of the dental profession must realize that we, too, must move at a rapid pace or else we lose or devitalize many of the important advances that have been made.

The dental profession is an important integral part of American life. Our prestige and our responsibilities demand that we accept the challenges that are being put before us. I assure you we will always do so.

We are in a position somewhat like that of the queen in Lewis Carroll's *Through the Looking Glass,* when she said to Alice, "Now, here, you see, it takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

The economic, industrial, sociologic, scientific and professional development of any phase of American life—including dentistry—has somewhat the same aspect that Alice found in Wonderland. To stand still is to fall behind as the economic, industrial, sociologic, scientific and professional expansion of this nation, as well as other nations, proceeds. To "get somewhere" requires a faster than national or international rate of growth.

The dental profession has an obligation to the American public to continue "getting somewhere." We still have many unsolved problems, but we are trying and we will continue to keep trying to elevate the dental health of our people, and in so doing, we are contributing to the general health advancement of the public.

Throughout visits to so many of the splendid dental organizations in the United States, I have held to my conviction that there are several projects on which we need to concentrate our efforts in addition to the many routine procedures that are so necessary for the functioning of a good organization.

I am submitting for your serious consideration, and I hope active participation, six major objectives that I consider necessary to achieve this coming year.

1. National Institute of Dental Research Building • For ten years the construction of a building and facilities for the National Institute of Dental Research has been a worthy project of the Associa-

tion that has received Congressional approval, but as yet, the federal budget has not included the money that is needed to build the building. I feel that the time is right for us to make an "all out" effort to secure this much needed building.

We must have a new appreciation of dental research. Although we will continue to make progress in corrective and restorative procedures, there is no doubt but that dental research is going to become increasingly important. With so many of our people failing military physical examinations, and with so many of our people suffering from all types of dental diseases and disabilities, we have an obligation to make every effort to emphasize dental research more than ever before.

2. Jenkins-Keogh Bill • We are all familiar with the purpose of the Jenkins-Keogh and similar-type bills. There is no doubt that members of the dental profession would benefit tremendously by the enactment of such legislation which would eliminate tax discrimination against dentists and other self-employed people. The American Thrift Assembly, which represents 26 major professional and business organizations including the American Dental Association, is making a strenuous effort on behalf of this bill. The chances of the bill being enacted this year are good.

3. Army-Air Force Dental Bill • The four years I served on active duty during World War II, the 13 years that I have been a reserve officer, and travels during the last several years both at home and abroad, have convinced me that we have an obligation to make a new attempt to secure the enactment of legislation so that members of the Dental Corps of the Army and Air Force can enjoy the same prestige and advantages now provided by law for members of the Navy Dental Corps.

I would like to state publicily that Dr. Berry, Assistant Secretary of Defense for Health and Medical Affairs, is most cooperative with the dental profession. However, I still feel that a greater sense of security would result in a more stable dental service by the enactment of this legislation. Regardless of the difficulties to be encountered, I feel we should and can obtain this legislation.

4. Expanded Activities of the Council on International Relations • Having been privileged to visit Japan and the Philippines this spring, and also having visited Mexico and Europe in the past, I am convinced that the activities of the Council on International Relations need to be expanded. Awareness of the splendid friendship and cooperation that exist between the American Dental Association and the dentists of Europe prompts me to urge that we direct increased attention to the dental associations in the Far East, in Mexico, in South America, in Australia, and in other countries that are friendly toward the United States. Many of the dental associations of the world look to the American Dental Association for leadership, and I know that we have the necessary personnel with ability, who can and will cooperate for the benefit of humanity.

5. More and Better Dental Care for Persons in Mental Institutions, Hospitals and Penal Institutions • Although some progress has been made in achieving better dental care for persons in hospitals and penal institutions, we know that much progress still is needed if more and better dental care is to be made available. Over 17 million American people (1 out of 10) are in institutions. Many thousands of our citizens are in mental institutions, many thousands are in nursing homes, crippled children's homes, homes for the aged and chronically ill, homes for handicapped individuals, and also, many thousands are in penal institutions. A small percentage of these state

and privately-owned institutions can furnish adequate dental care, but the percentage is pitifully small.

Many authorities feel that caring for such persons is the nation's number one problem. As a major health profession, dentistry has serious responsibilities in this field. These unfortunate individuals need our care, and I am hopeful of seeing greater activity and participation in this area.

6. Dental Examinations for Applicants for Life Insurance • Although it is difficult for the dental profession to point to instances in which lack of dental care caused death, we do know that the lack of dental care is a major contributing cause in many crippling and disabling diseases and sometimes even in death. Furthermore insurance company dental examination charts would have great forensic value. Dental charts have frequently been of great assistance in the identification of badly mutilated corpses. In times of disaster—whether by war, flood, fire, explosion or otherwise—the task of identification frequently falls on the dentist. Insurance company dental examination charts and records would greatly simplify the task, for even when fingerprints are gone, teeth generally remain.

Although I feel that this idea of dental examinations for applicants for life insurance will probably require some time before acceptance, I have been encouraged by insurance executives who believe such a program is possible. Today many persons applying for federal, state and city civil service positions are required to have dental examinations. Most business and governmental authorities appreciate preventive care and adequate records.

I realize that all of these objectives cannot be accomplished quickly. None of the six points are contrary to American Dental Association policy. I also realize that a progressive and positive leadership, on the part of the Association, as well as the expanded activity that our membership expects, is going to cost more money. If we expand activities, I favor increased dues; if we stand still and thus retreat, we do not need increased dues.

I am convinced that the members of the American Dental Association want to be as well represented as possible in all phases of American life. I am firmly convinced that when we show our membership the necessity for continued expansion to achieve these important health objectives, they will cooperate in every way possible.

I also realize that it is going to take the active participation of our entire membership to accomplish these goals. It is not fair to say, "Let the Central Office do it." We have an excellent Central Office staff for administrative help, but their purpose is to carry out, not to make, the policies adopted by the House of Delegates of the American Dental Association. Our ethics must be of the highest; our moral fiber, the finest and strongest. This, of all times, is the moment for great building, great achievement. The dimensions of American dentistry are the dimensions of American life. We have a splendid dental organization, and with determined purpose we will reach our goals.

Boyle Building

Cases and Comments

A DIFFERENT TECHNIC OF ANTERIOR PORCELAIN JACKET CROWN PREPARATION

Julian Rieser, D.D.S., New York, and Wilbur Aaronson, D.M.D., Mt. Vernon, N. Y.

The consensus among general practitioners seems to be that the anterior porcelain jacket crown preparation, with a full peripheral shoulder, is the most difficult of all preparations. The principal problems that must be met in the execution of this preparation are, in order of difficulty, (1) the reduction and directional inclining of the labial surface to allow for sufficient thickness of porcelain to control color and alignment, (2) the creation of uniform and smoothly continuous labial and lingual shoulders and (3) the joining of the labial and lingual shoulders with those on the proximal aspects in an uninterrupted flowing contour.

The technic to be described for this preparation takes advantage of several well-known facts that are quite familiar to every practicing dentist. It is obvious that, when a tooth that is to be prepared already has a labial or lingual gingival filling, part of the task of crown preparation is simplified, for, in these instances, when the filling is removed, it is found that not only is the shoulder at almost the correct gingival position and axial depth but there is also a clearcut indication of the extent of reduction of the labial surface that is necessary or possible. Thus, it seems desirable to alter the usual instrumentation and technic to facilitate further the execution of this preparation on an uncut tooth.

A typical Class V cavity is prepared on the labial surface with a no. 7 inverted cone diamond stone, the axial depth and gingival termination of the shoulder thus being automatically established. However, instead of preserving the proximal walls of this cavity as would be done in a preparation for a filling, the stone is allowed to run off proximally into the interproximal spaces in a manner that would not be permissible if retention of a filling were the consideration (Fig. 1). This step is repeated on the lingual surface (Fig. 2).

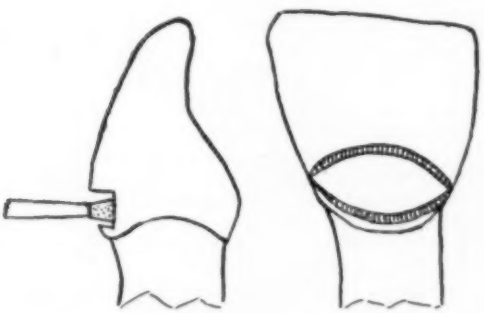


Fig. 1 • Left: Making Class V preparation on labial surface. Edges of preparation fade out at proximal aspects. Right: Completed preparation on liabial surface

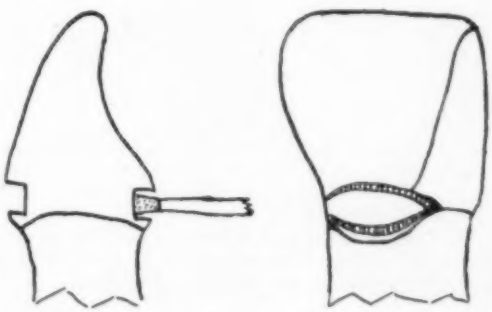


Fig. 2 • Left: Making Class V preparation on lingual surface. Right: Completed preparation on lingual surface

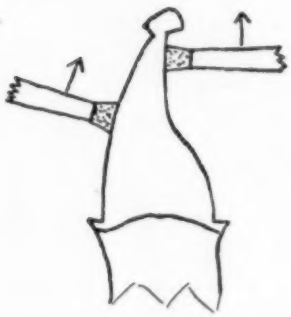


Fig. 3 • Stripping enamel from buccal and lingual surfaces

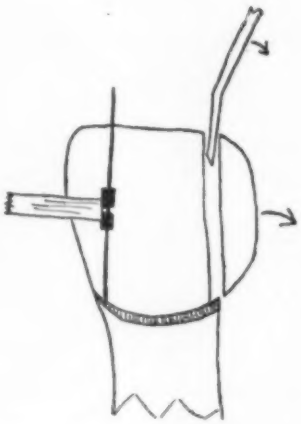


Fig. 4 • Diamond disk cutting proximal surfaces and creating shoulders at the same time. Chisel breaks away enamel

Fig. 5 • Connecting shoulders and rounding corners

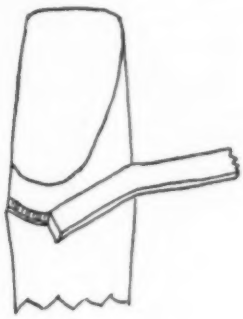


Fig. 6 • Beveling shoulder before reduction of incisal surface

Fig. 7 • Finished preparation with incisal surface reduced

The sizes of inverted cone stones used can be varied depending on the size of the tooth, with the largest possible size being used when indicated to enlarge the cavity in an incisal direction only. It is an established fact that an inverted cone which cuts on all surfaces is extremely efficient when it is pulled through enamel and dentin. The entire labial surface can be stripped in this manner to the desired depth and in the required direction. The lingual surface is then treated in an identical manner (Fig. 3).

When these steps have been completed, an examination of the preparation will disclose a true labial and lingual shoulder and equal, proper reduction of the labial and lingual enamel and dentin.

The proximal surfaces are reduced with a diamond disk of any suitable diameter. This instrument is placed on the incisal edge approximately 1 to 1½ mm. from the proximal incisal angle and is tilted at the angle of the proposed proximal surface. The disk is allowed to cut gingivally into the tooth structure to the level of the anticipated proximal shoulder. This step is then repeated on the opposite proximal surface. Care must be taken to cut away a wedge of tooth rather than merely slice the proximal surface by abrasion as is the usual custom. This piece of proximal

tooth substance is then broken away from the body of the crown by inserting a straight chisel into the cut and twisting it slightly (Fig. 4).

Careful examination of the roentgenograms will reveal an abnormally large or small pulp and thus aid in determining the dimensions of the wedge of tooth that is cut away. If the terminations of the proximal cuts are at the correct gingival position, they will meet the proximal fade-outs on the labial and lingual shoulders that were created in the first step of the preparation.

To smooth the shoulder and, if necessary, place it subgingivally, cylindrical diamond stones or end-cutting burs and files can be used (Fig. 5). If a gold core is to be fabricated for the jacket, an additional peripheral bevel or finishing line is prepared with files or chisels as convenience and adaptability dictate.

The final step before the sandpapering of the prepared surface is the reduction of the incisal height and creation of its correct horizontal bevel (Fig. 6 and 7). Any wheel-shaped stone is suitable for this.

This preparation should be attempted first on an ivorine or wet extracted tooth, before it is tried in the mouth. The ease and speed with which the preparation can be made with this technic are impressive, and operators who have tried it say that the results are most gratifying.

501 Fifth Avenue

DENTURE CLEANSERS

By Jerome S. Mittelman, D.D.S., New York.

There is no doubt but that periodic cleaning of artificial dentures in the dental office has become an accepted procedure. Accumulations that almost invariably appear after a denture has been worn for a time testify to the average person's inability to prevent or to remove them. Because they form so insidiously, patients rarely even notice them until these crusts are so hard they cannot be removed by usual home care methods. Therefore, patients ask their dentists to return the dentures to a clean, hygienic condition. When they do not, the dentist should suggest it.

Cleaning dentures periodically in the office by instrumentation followed by lathe polishing can be time consuming, regardless of whether it is done by the dentist himself or by auxiliary personnel; also, it can cause physical damage, however slight. Cleaning by chemical methods has proved more efficient as well as kinder to denture plastics than cleaning by mechanical means.

A 15 to 30 per cent solution of hydrochloric acid serves as an excellent medium for artificial denture immersion for removal of alkaline tartar and stains. The time allowed varies with each particular denture, but averages approximately five minutes. After neutralizing the formations in sodium bicarbonate solution and rinsing, they can be brushed away easily.

A check with the leading producers of denture acrylic resin and acrylic teeth has indicated that this method is not only safe, but is enthusiastically endorsed, except for dentures where anterior porcelain teeth with metal retainer pins have been used in the construction. Naturally, because of the necessity for adequate neutralization, even the most dilute acid solutions may be dangerous for home use.

Experience has shown that this method of periodic denture cleaning is safe, effective, and gratifying.

30 East Sixtieth Street

OCCLUSAL ADJUSTMENT

By Jerome S. Mittelman, D.D.S., New York.

Precise adjustment of occlusion depends to a great extent on the accurate determination of occlusal contact and excursions. Various technics and materials such as articulation paper and strips of wax have their merit, but they lack a degree of delicacy that the method suggested here might offer in a great many instances.

The ideal material to record occlusion should be thin and not bulky so that it offers no resistance to the occluding teeth and does not guide the teeth as they close. It should make a precise mark on the exact spot of contact, not simply indicate an approximate area, and it should be easy to handle. In addition, the method should not be time consuming.

To provide a burnish mark immediately on contact, a film should be painted on the surface or surfaces in question. The film must be nonresistant to pressure, readily adherent yet easily removed, and nonsmearing. It should be thin, so that unlike low-fusing wax that is sometimes flowed onto occlusal surfaces, the burnish mark can be detected more readily and accurately.

A small piece of low-fusing temporary stopping is placed in a dappen dish. With a no. 0 brush that has been dipped in chloroform, the operator wipes the temporary stopping and applies the brush to the dried surfaces to be tested. The film dries readily, and the occlusal contact can be determined immediately. For greater visibility, a small

piece of articulating paper can be added to the stopping so that the ink is incorporated in the film. Sometimes it is helpful to include a few drops of chloroform in the dappen dish in order to hasten the process.

There are several variations of the technic that can be used, but the coating of the occlusal surface with a thin, semihard indicator is the essential part. Tooth-polishing pumice readily removes the remaining residue.

This is a much more precise method of determining occlusal contact than is either conventional method—articulating paper or wax. It locates premature contacts and high spots easily and precisely.

30 East Sixtieth Street

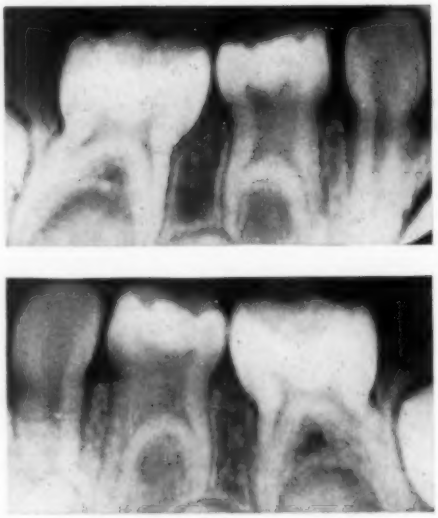
TAURODONTIA IN DECIDUOUS FIRST MOLARS

By Manuel M. Album, D.D.S., Jenkintown, Pa.

Taurodontia is a rare anomaly of molars in which the body of the tooth is enlarged at the expense of the roots. The condition is believed to result from interference during the morphodifferentiation stage of tooth development. A case of taurodontia will be presented in this paper.

Few references to taurodontia are found in the dental literature. The condition is considered to be a characteristic of the teeth of the Neanderthal race and occurs rarely in modern teeth. Keith[1] considered taurodontia a diagnostic point in the examination of fossil teeth, and, in 1928, Shaw[2] published a paper on the occurrence of the condition in the Australoid tribe of South Africa. Lunt[3] reported on histologic sections of a tooth with taurodontia in 1954. Her paper stated that there was a small, detached apical portion of dentin that formed the floor of the pulp chamber. The body of the tooth was elongated, and the author attributed this to an upset in the morphologic function of Hertwig's sheath.

Taurodontia was revealed in both deciduous lower first molars of a five year old girl by full mouth roentgenographic examination. The child had come in for treatment of an abscessed maxillary deciduous left second molar. Roentgenograms revealed taurodontia, and, in addition, the permanent first bicuspid appeared to be distal to the roots of the deciduous first molars rather than below or between them. The depth of the pulp chamber in both of the lower first molars which showed taurodontia was at the expense of the roots, producing a long tooth body and short roots.



Taurodontia can be seen in deciduous lower right and left first molars. Second molars appear to be normal

Hillside Avenue and York Road

1. Keith, Arthur. Problems relating to the teeth of the earlier forms of prehistoric man. Prod. Odont. Sect. Roy. Soc. Med. 6:103 April 1913.

2. Shaw, J. C. M. Taurodont teeth in South African races. J. Anat. London 62:476 July 1928.

3. Lunt, Dorothy A. Case of taurodontism in a modern European molar. D. Record 74:307 Nov. 1954.

COUNCIL ON DENTAL EDUCATION

Dental schools and graduates: 1840-1957

With the recent release of the 1957-1958 *Dental Students' Register,* an annual publication providing information on enrollment figures and requirements of the dental schools, the Council felt that the profession might be interested in a brief history of dental education in terms of the numbers of schools and the numbers of graduates.

DENTAL SCHOOLS

The progress in dental education is characterized more properly by the improvement in quality than by the mere increase in quantity, but both factors are of significance. As indicated in Figure 1, the peak in the number of dental schools occurred in the early 1900's, when 57 dental schools were graduating dentists. In terms of numbers of schools, this might seem like an impressive total, but it should be noted that the dental program at that time consisted of three terms of five months each, a total of 15 months, and the predental requirements specified that the candidate must have completed successfully one year of high school. There is quite a contrast between these requirements and today's standards of a four year dental program and a minimum of two years of predental study at the college level. It is not the intention of this report to relate the history of education in general, but in considering the early preprofessional requirements charted at the bottom of Figure 1, it should be remembered that high school and college education at the turn of the century were afforded to a very few.

The decrease in the number of dental schools from 1901 to 1930 is a reflection of higher and more rigid requirements rather than of a decrease in the demand for dental care. In 1902 the predental requirements were increased from one year of high school to two years of high school. In 1903 a four year dental program, with each year consisting of seven months, was introduced, but one year later this program was dropped in favor of a three year program with each year representing 30 weeks of six days each. In 1907 the predental requirements were increased from two years of high school to three years of high school, and the requirement of four years of high school was firmly established in 1910.

The year of 1910 is a significant one in the history of dental education because it was then that the Dental Educational Council of America was established. There is not the space in this report to discuss the problems of the Dental Educational Council in bringing to the public and to the colleges the first formal stages in the accreditation of dental schools, but it is accurate to say that this agency did much to standardize the educational programs offered by the various dental schools and to establish detailed and specific minimum standards. One of the significant requirements established by this Council related to proprietary schools. It is an accepted educational philosophy today that an educational institution must not be a profit-making organization, and this philosophy became a policy in dental education when the Dental Educational Council publicly announced its accreditation program in 1918.

During the 27 years that the Dental

Educational Council of America was in operation, the number of dental schools decreased and the quality of the educational programs increased. From 1917 to 1926 the four year dental program and the prerequisite of a high school education were standard. From 1926 to 1935 a dental education represented five years of study beyond the high school level. During this period a dental degree was obtained after one year of college plus four years of dental school, or after two years of college and three years of dental school. From 1935 to date the preprofessional training has been a minimum of two years and the professional training four years in length.

Shortly after the Dental Educational Council of America was dissolved and the Council on Dental Education of the American Dental Association established in 1937, the new Council further strengthened the predental requirements by specifying certain subject areas that were to be included in the preprofessional course of study.

It is interesting to note that from 1933 through 1947 the number of dental schools remained constant. This period of stability in the number of schools may be related in part to the economic condition of the country, but it more truly represents a period of self-appraisal, a period in which dental education improved its programs and its course contents, established itself in its proper position in the academic family, and mustered its forces for the growth that was to come. The increase in the number of dental schools since 1947 is true growth, growth in the number of programs being offered at the highest professional level.

DENTAL GRADUATES

Picturing the number of dental schools does not tell the whole story of the growth in the production of dentists. In 1901

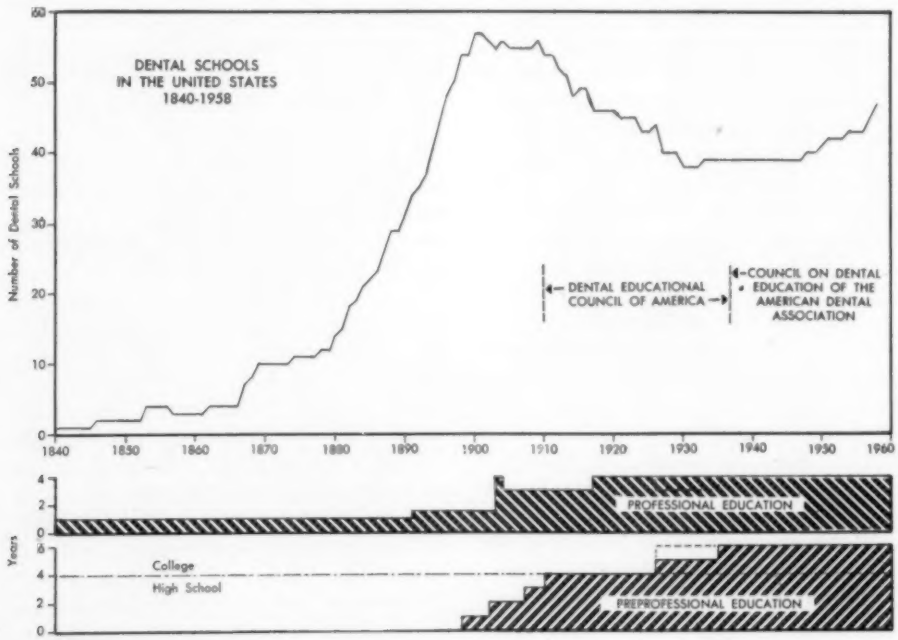


Fig. 1 • Dental schools in the United States, 1840-1958

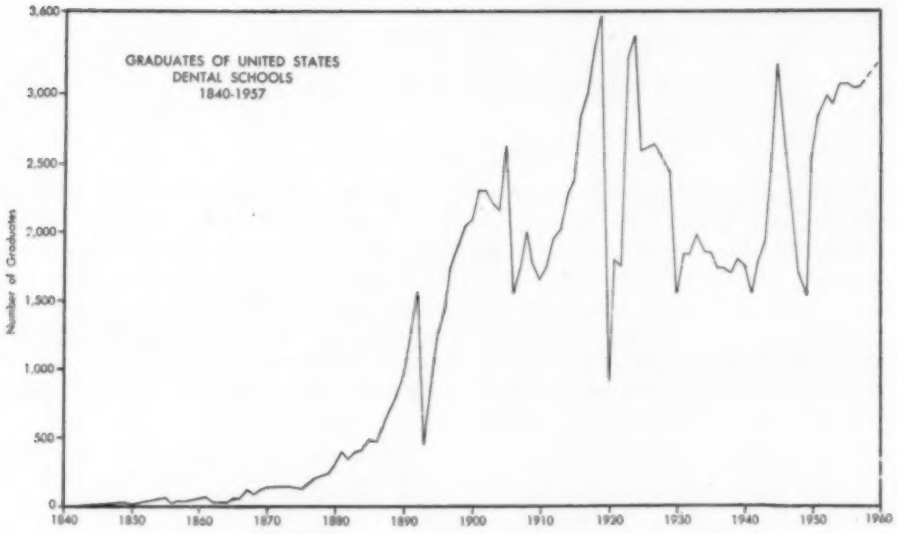


Fig. 2 • Graduates of United States dental schools, 1840-1957

when the peak number of schools were in operation, the average graduating class represented 40 dentists. In 1924 the average graduating class numbered 80. The average size of the graduating class has varied all the way from two students to 82 students. The actual number of dentists graduated each year since 1841 is presented in Figure 2. There have been ups and downs in the numbers graduated each year, with wars, veteran benefits, recessions and the general economic picture all exerting varying influences, but the trend has been in an upward direction.

In total figures, 152,947 dentists have been educated by the dental schools in this country since 1840. Of this number 53,263, or 35 per cent, were graduated after 1935, and therefore were the products of the four year dental program with a minimum of two years of preprofessional study. It is estimated that about 50 per cent of the 100,000 dentists living today were educated under the standards that are in effect today.

Again directing attention to the period from 1935 to date, the era of the present standard of a four year dental program with two years of predental study, at least three nominal recessions, two wars and two groups of veterans influence the picture. The large number graduated in 1945 and the small numbers graduated in 1941 and 1949 are reflections of the times, but even with these extremes, the over-all growth in the numbers of dentists produced by modern dental education is apparent. In the 22 year history of modern dental education, the number of graduates has increased from approximately 1,700 per year to over 3,000 per year. The projection to 1960 which is included in Figure 2 is based on the undergraduate classes now enrolled in dental schools, and it is interesting to note that this projection is consistent with the trend line which has been established since 1935. The graduating dental class has been increasing in size by approximately 60 additional graduates each year. This is a sound growth, and one in which the profession can take pride.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

A motivational study of dental care

This is the second installment of a pilot motivational research study conducted for the American Dental Association by Social Research, Inc. The first installment, which appeared in March, outlined the scope and methodology of the study and discussed the basic concepts, feelings and beliefs people have with regard to their teeth and dental care. This installment defines the various levels of social class and shows how closely appreciation for dental health is connected with social class. Another chapter in this installment explores the dental aspects of childhood, establishing the special, and in some respects critical, meanings of the teeth and mouth in childhood experience. There will be two more installments.

II. SOCIAL CLASS AND DENTAL CARE ATTITUDES AND PRACTICES

By far the most significant consideration in understanding different types of dental care attitudes and practices is the concept of social class. Consider, for example, the distribution for a particular index of dental care, frequency of visit to the dentist, as shown in Table 4.

Over-all, 35 per cent of the sample visit a dentist once a year or more; 39 per cent see a dentist less than once a year; and 25 per cent use a dentist only when it is an emergency or not at all. It is possible that respondents are not accurate in their estimates, or that for one of a variety of reasons they do not recall how often they see a dentist. However, if there is such a bias in these results, other evidence strongly suggests it is in the direction of more frequent visits than is actually the case, rather than respondents underestimating how often they receive professional dental care.

The variance between these "practices" and the feeling that teeth and dental care are important is apparent immediately. So, too, is the fact that, with very few exceptions, respondents agree that sound dental care involves professional dental care, as they repeatedly stated in these interviews. Yet what is "known" and what is "done" in many instances are two different things, an observation which perhaps refocuses a central problem in dental care education. The problem does not appear to be one of increasing awareness of the importance of professional dental care, for this has already been accomplished. People know what good dental care entails. What seems to be necessary is to communicate this information in a more meaningful and motivating manner, and to recognize that different types of communications are required for different segments of the population.

More revealing than the over-all figures contained in Table 4 is the distribution for each of the four social class groups. Though the numbers are small in their subdivisions, it is clear that higher status people are very likely to care for their teeth (in terms of this and other criteria) and that lower status people are not as likely to care for them. To take the two extremes of the sample, 82 per cent of the upper middle class respondents see a dentist once a year or more, whereas only 6 per cent of the lower lower class respondents see a dentist with this frequency. Instead, in this latter group, 50 per cent say they never see a dentist or see one only in an emergency.

Table 4 • Frequency of visit to the dentist by social class distribution

	Upper middle class		Lower middle class		Upper lower class		Lower lower class		Total sample	
	No.	%	No.	%	No.	%	No.	%	No.	%
Teen-agers who wear braces	5	29	2	5	—	—	—	—	7	6
Two or more times a year	5	29	7	19	3	7	—	—	15	13
Once a year	4	24	8	22	5	11	1	6	18	16
Less than once a year	1	6	17	46	19	43	8	44	45	39
Emergencies only	—	—	2	5	13	29	3	17	18	16
Never	2	12	1	3	2	5	6	33	11	9
No response	—	—	—	—	2	5	—	—	2	2
Total	17	100	37	100	44	100	18	100	116	100

The other two groups, the lower middle and the upper lower class fall between these extremes, with the former seeing their dentist more often than the latter.

Social class is a concept used by social scientists in helping to explain a variety of differences in behavior, thought, and feelings among people. It does not refer directly to income, for in and of itself the amount of money a person possesses does not account for his behavior or attitudes. Instead, it characterizes a style of life, a body of values, and for that matter, a type of personality organization which in large measure determines how a person views himself and the world in which he participates.

For present purposes we differentiate between four social class positions, each of which is built of a number of factors, including occupation, source of income, education, residential area, type of house, organizational memberships, and the like. By giving a numerical weight to each of these factors, it is possible to measure an individual's position on the social scale. Briefly, here are some of the characteristics of each of these four groups and the manner in which they influence dental care practices and attitudes.

The Upper Middle Class • The upper middle class is the professional and business executive group, well-educated, living in preferred areas, in well-maintained and usually spacious homes. Dynamically, they approach life as a challenge to be countered, cushioned and deterred through skillful manipulation, forethought, management and leadership on their part. They seek out "expert" advice, and in areas where they feel it is important, follow through with considerable religiosity. They take a long range view of life and want to feel prepared, to know how to prevent, or at least to deter for as long as possible, the unavoidable: aging, disease, decay, death.

This approach is reflected in their attitudes toward dental care. They value their teeth and are interested in preventive dentistry. They are concerned with their appearance, and feel that the "cosmetic" value of teeth is important. Not only do they, themselves, do things to and for their teeth; they are interested in finding out what others can do for them in order to prevent decay and loss, and they therefore actively pursue various types of dental care. The dentist is seen as a professional who not only repairs teeth and stops pain; he is also someone who prevents decay and loss, who corrects and makes more attractive and useful a person's teeth.

Dental care for the upper middle class person begins early in life—when the first teeth appear and the parent displays

keen interest in this stage of development and gives recognition and care to the child's mouth and teeth. The upper middle class mother believes that early dental care, in practice and in attitude, is important, and is apt to have the child at the dentist at an early age.

> Children's teeth are much smaller and they are not permanent [so this respondent defines children's teeth]. They should be checked by a dentist when they are two years old, and should be brushed every day. I think the mother should brush them as soon as the child has teeth.
>
> (UM, 37, Woman)

Of course, upper middle class people have the resources to pursue this type of dental care. These resources are financial, but also include a conception of teeth which accentuates their value to the individual, the desirability of having one's own teeth for as long as possible, the notion that teeth need not decay—that instead they can be preserved by proper and preventive care. Moreover, they consider good looking teeth and clean teeth a value in and of itself, for it enhances the personal feelings they desire to have of themselves.

One further point: upper middle class people think of themselves as highly rational, willing to be swayed only by authoritative sources. Thus they are keenly interested in science and what it promises to do for them. Then, too, they are exposed to a very wide range of media, and are usually the quickest to "pick up" new "scientific" trends. This information they apply to themselves and to their families, and look to the professional dentist as the authority in this area of personal care.

The Lower Middle Class • Occupationally, the lower middle class are the owners of small businesses, minor executives, teachers, salesmen, and white collar workers. They are a highly moralistic group, usually with at least a high school education, who live in well-maintained, clean, pleasant neighborhoods. In urban communities, the lower middle class is estimated to comprise about 35 per cent of the total population.

Lower middle class people admire the higher status group, and in many ways (tastes, values) seek to emulate them. More often than not, upper middle class behavior is followed by these people, but they are not necessarily motivated by the same considerations. Thus, rather than pursuing certain goals because of the personal pleasures accruing from them, as tends to be the case with upper middle class individuals, lower middle class people are more concerned with maintaining the proper behavior, with the notion of duty being a value in and of itself. They are not nearly as individualistic in their beliefs or feelings, often find gratification in the act of performing more than in the results achieved by this behavior.

It is likely that lower middle class people are the most compulsive in their dental care attitudes and practices. This tentative conclusion is based on the present data as well as on related information concerning the lower middle status group. Dental care is more of a "duty"—something which must be done, which children must learn early in life, and which requires careful supervision from the parent. The dentist is regarded as an authority—not always a friendly authority (as tends to be the case among upper middle class people), but someone who "fixes" teeth, who gives directions as to how teeth should be cared for (directions which are followed more to the letter than the spirit), and who is useful for preventive dentistry.

Dental training begins early in the group, and is followed through with considerable persistence and not always with accompanying flexibility. Parents will care for the child's teeth (a lower middle class woman tells us that "when my children were little I used a soft clean cloth to wipe their teeth") and the child is expected to brush his teeth regularly at a

relatively early age. We would suspect that visits to a dentist's office are often made while the child has baby teeth, though our data do not include evidence on this point.

These lower middle class people are very concerned with how their teeth look to others; the social value of teeth, the maintenance of a proper "social self," is considered of extreme importance. There are probably some limitations placed on corrective dentistry, such as providing braces for children, but this is more a matter of economics than desire. Over-all, these people think of dental care as an essential part of the self-care ritual they engage in, and although it is likely that there is some resentment against over-regimentation and orderliness, the necessity to be clean, good, conforming, and socially presentable, makes for a high standard of dental care among this status level.

The Upper Lower Class • The upper lower class is the group which needs to become the objective of major educational efforts regarding dental care, and this is primarily because they are the most accessible to these attempts and offer the best possibilities of behavioral and attitudinal changes.

Upper lower class people are the skilled and semi-skilled blue collar workers. Currently, they enjoy a high standard of living as measured by income; and by this measure they are quite close to the lower middle class. Most upper lower class people have a modest education (sixth to twelfth grade most often), live in semi-deteriorated, old-looking neighborhoods, are law abiding, respectable, hard-working citizens.

In contrast to the sense of conformity and desire to plan ahead exhibited by middle class people, these individuals live on a "day to day" basis (at least, when viewed from a middle class perspective and bias). They set for themselves fewer rules and regulations, are more indulgent of themselves and permissive with their children. In rather sharp contrast to higher status groups, upper lower class people are resigned to whatever happens; they feel that some personal or familial catastrophe will happen and believe there is little they can do to stave off the inevitable. Among other things, this reflects their attitude toward physical aging, disease, death; in the area of dental care it pertains to their view of tooth decay and the rather strongly felt notion that teeth eventually rot, fall out, or have to be pulled.

In some ways this is a realistic appraisal of their situation. On the basis of the present data, we suspect that the type of professional dental care they receive is not geared to maintaining one's own teeth. Dentists they typically see treat them for their present, immediate problems. In part, this is because they do not consider seeing a dentist at regular intervals for check-ups and preventive measures; in part, because these dentists recognize their advice is not apt to be heeded; in part, because the dentists they use approach their work in terms of fixing, repairing, extracting, and so on. This is characteristic of upper lower class people's attitudes toward health in general: it usually is not planned for, illness is considered inevitable and is felt to be serious to the degree in which it interferes with habitual patterns of activity, and is defined as a professional (rather than personal) problem if and when it reaches a more disabling stage. Self-medication, based on popular notions of what an illness is and what remedies are apt to relieve or cure it, do interest them. As for physicians and dentists, they typically do not have continuing personal relations with authority figures of this type.

It is not only professional dental care that upper lower class people do not follow with any "ritualistic" pattern; this also describes the type of personal dental care they engage in. Of course, most of them own a toothbrush and use it with

some regularity; we note, however, that brushing is not engaged in with the same obsessive approach.

In this connection their feeling, in general, is that things "naturally" get dirty, so therefore why bother to be compulsive about cleaning. Body care is not highly ritualized, and neither is the way they usually go about caring for their mouth and teeth. This same orientation one discerns in connection with child training habits: children are instructed how to care for their teeth, but without the forcefulness and parental interest and concern exhibited by higher status people. The feeling in this area, as in others involving personal care, is that the child should learn to take care of himself—as early as possible. Parental duties are discharged when the child is instructed how to do it, given the opportunity to master the task, and then "put on his own," so to speak.

Thus, an upper lower class mother tells us that "children should be taught to brush their teeth as soon as they are old enough," with the added implication that once they are taught they are responsible for their own behavior. By no means should this be taken as exemplifying a lack of parental concern; rather, it is the upper lower class person's way of looking at the world, the family, him- or herself. This type of training, however, does not always result in what middle class people think of as "proper" dental care, but for these people it is and reflects what they believe to be adequate concern with the teeth and suitable child training in this regard.

The Lower Lower Class • The lower lower class, estimated to be about 20 per cent of urban populations, are the unskilled laborers, people who shift from job to job, have a limited education (elementary school or less), the ne'er-do-wells who occupy the deteriorated slum areas and who exhibit no stable (again, from a middle class point of view) pattern of life. As a group they are the ones who reveal the most consistent neglect of teeth—and, what is more, are not concerned about whether they care for or neglect their teeth. In terms of dental health education, they offer a serious and an exceedingly difficult problem.

Attitudes of upper lower class people are exaggerated among the lower lower class. Tooth decay and loss are considered inevitable—not at old age, but very often by the time a person is in his twenties or thirties. As represented by our sample of lower lower class people, this is especially understandable since a high percentage of them have had teeth pulled in their teens and have dentures by the time they are in their mid-twenties. This is by no means surprising to them; indeed, they believe that this is a part of life, and even feel that there are some advantages in dentures over natural teeth.

Lower lower class respondents exemplify in a most striking manner how people can know about "proper" dental health behaviors, as well as be aware of the importance of teeth and dental care, yet not care or be concerned about it when applied to themselves. Some of them do not brush their teeth, let alone receive other types of dental care; even a toothache does not always mean that it is time to see a dentist—the pain must be quite severe before this "last step" is taken. Consider, for example, the way a young lower lower class man—in some respects a stereotype of a lower lower class individual—talks about teeth and dental care. When asked what type of toothbrush and toothpaste he uses, he says, "I don't use any at all," and explains that he did use one "about 15 years ago." He tells us that he does not give very good care to his teeth, but adds, "I have plenty of bad teeth; I intend to have them all pulled and get false teeth, but never have. . . . My only problem (with my teeth) is having them decay, so I just have them pulled. None has given me any

trouble lately, so I haven't done nothing about them."

His completions to several sentence stems are of particular interest, as they indicate his familiarity with the "rules" of dental care.

"A toothbrush and toothpaste are . . . people should use them, but of course I don't."

"To avoid getting cavities . . . have them looked after."

"The worst thing to do to your teeth . . . is biting on hard stuff and no care."

Lower lower class people exhibit many features of social disorganization. Their life is oriented around the present, they seek immediate gratifications and fulfillment of (often monetary) wants, and do not always or completely accept the values of the major cultural group. Dental care, of course, is a cultural value, and in this area, as in many others, these people have not internalized behaviors and attitudes that to a greater or lesser extent are taken for granted by members of the dominant social classes.

COMMENT

The preceding discussion of social class emphasized differences in dental care attitudes and behaviors. With each social class group we have attempted to discern prominent behavioral orientations and their underlying motivations as these relate to the life style and personality structure associated with each group. The evidence collected for this pilot inquiry indicates that this approach is valid, and that any further social psychological study of dental care would do well to amplify and elaborate on these differences in a way that would be meaningful and instructive.

It is also necessary to note, however, that attitudes toward dental care and health, as held by one particular status group, are not completely foreign to another. The issues and themes which appear in this area in some fashion and to some degree come to the fore in connection with all people, regardless of their social class placement. In one group a specific issue is more exaggerated; in another, a different orientation stands out. But this is a relative matter, for common to all people are certain basic meanings, experiences, and fantasies regarding teeth and dental care. In part, these have been referred to in chapter I; they now will be taken up in somewhat greater detail in the following three chapters.

III. CHILDHOOD AND DENTAL CARE

In talking about teeth and dental care it is not possible to neglect the impact of infantile experiences. These set a pattern for future development, fantasies, biases, and beliefs. They emphasize the fact that we do things in a connective and not forgotten sequence of personal experience and environmental pressures. Regarding teeth, this observation is particularly relevant. As derived from the interviews and from some of the literature on early childhood development, a few of the reasons accounting for this importance can be enumerated as follows:

The Mouth Is the Original Source of Pleasure • The young infant's entire world is centered in and around his mouth. His sense of well-being, his ease from excitement, his pains and pleasures, are all focused in this body area. This is the organ with which a person has his first direct contact with his environment. The mouth and lips alone are not involved; sucking also includes sensations of touch, warmth, neck, head and body movements, along with the action of the lips and tongue. These gratifications, since they are not differentiated at an early age, are fused in the oral zone,

and many adults persist in achieving the deepest of all gratifications from oral activities.

Trouble Begins With Teeth and Teething • The idyllic existence of the infant is disrupted by the appearance of teeth. Biting is the earliest "catastrophe" in the individual's relations to his world and, thereby, to himself, for with the onset of teething this receptive gratifying oral zone becomes a source of pain. Moreover, teething interferes with the heretofore giving and receiving relationship between mother and child. When the child begins to bite, the mother reacts by pulling away, and the very smooth rhythm of hunger-satiation-sleep is disrupted. Also, the weaning process is often closely correlated with the time that teething begins, and all this calls for tremendous readjustments on the child's part, most of which are experienced as painful.

In this sense, pain and teeth are "partners" from the start, a feeling about teeth that is carried into and through adulthood. This helps us understand why the mouth and, even more specifically, the teeth are so often felt to require vigorous cleaning and, at the same time, are both expected and "permitted" (by virtue of neglect) to cause trouble. For this organ readily can become associated with a sense of "evil" and "dirtiness" that derives from infantile experiences and fantasies. Thus, the somewhat paradoxical situation is encountered of individuals who engage in very compulsive and vigorous brushing, who use excessively strong cleansing agents, but who are not always or primarily interested in proper dental care. They might well rationalize their behavior in this manner, but at times underlying these practices is an (unconscious) attempt to "clean up" this body cavity.

In a similar manner, dental neglect is in some ways and to some extent associated with these feelings about the mouth and teeth. Protracted delay in getting dental help, while all the while there is the realization that delay will only result in more trouble and pain, at times reflects an attempt to be punished (by pain and suffering) for the evilness of this body zone. These psychic mechanisms are by no means directly expressed, yet they are of consequence in understanding feelings about teeth and attitudes toward dental care.

There Are Gratifications From Teeth, Too • The ability to use one's teeth, to grasp and to hold on or bite off with them, is a major step and a great adventure in the life of the youngster. With it comes a sense of mastery of the environment that was not had previously. There are also the tactile stimulations associated with having teeth in the mouth, the ability to eat more solid and adult foods.

Within this framework of sensations and experiences teeth come to have many personal implications: they reward one in terms of mastery, they cause pain in a previously enjoyable area, they become and are used as instruments of attack. And within this framework and during this developmental stage teeth come to have meanings related to notions of good and evil, reward and punishment, passivity and aggressiveness—all crucial to the formation of personality and the foundation for later attitudes toward teeth and dental care.

Through each successive stage of development, teeth take on new meanings and always remain vital to the person's well being, as indicated by the way in which respondents talk about their childhood memories of teeth. Growing up is no easy business, and some of the pleasures and problems of growing are focused on or symbolized by teeth. Teething, losing deciduous teeth, getting second teeth, having a tooth knocked out, chipping a tooth, straightening crooked teeth, are but a few examples of this. These are

neither "neutral" or private concerns; always they are emotionally charged. Other people react to them: the child becomes an object of concern, attention, worry—or the butt of jokes and kidding. Beautiful teeth are praised, whereas disfigured ones are pitied. In this fashion teeth come to have social significance, and these considerations too play an important part in later attitudes toward dental health.

Dental Health Frequently Becomes Defined in Terms of Reward and Punishment • Parents make excessive use of teeth as a reason to give or, more usually, to deprive children of things they desire: candy, chewing gum, ice cream, cookies, and so on. Teeth thereby become involved in parent-child relationships and the ways in which parents attempt to control their children's behavior. The use of teeth as a rationale of this sort is perhaps more recent than the practice of withholding sweets from children, and there seem to be social class differences in the way this is accomplished. In any event, this is one of the early associations children have with teeth and dental care; namely, that because of dental health considerations they must forego certain pleasures they very much want to have—and even more importantly, that because of teeth and dental health their parents deprive them of things they want.

There is reason to believe that within this scheme dental health gets its initial "negative" definition—that good, healthy teeth and sound dental care means "giving up" something with only an intangible state of "dental health" gained in its place. It is within this framework that diet becomes defined as important in dental health, as one woman respondent indicates in not too pleasant a way. She says that "it seems everything that you like isn't good for your teeth, and everything that's good for your teeth you don't like. You usually just go ahead and eat the things you like, and years later find out that you've made a mistake."

Whatever the scientific basis for the relationship between sweets and dental health, it is used frequently by parents as a way of rewarding, punishing, or more generally controlling children. From the way in which parents in our sample talk about the relationship between children's teeth and candy, it is clear that they easily bring to bear dental health as an excuse for withholding things from their children. That this behavior has little to do with "rational" and "scientific" considerations is suggested by the practice of parents who reward the child for each deciduous tooth that comes out by giving the youngster money to buy candy. Of course, this also is a tacit way of saying that "adult" teeth are different from "baby" teeth.

Dental health, in this emotional situation, comes to take on meanings of seriousness, strictness, lacking in fun and enjoyment—attitudes readily revealed by adults and seemingly working against increased concern about caring for the teeth.

The Pleasures of Dental Care Are Not Many; Training Is a Difficult Matter • Along with parental admonitions to "brush your hair, clean your ears, hang up your clothes," comes "brush your teeth." How frequent and how insistent this instruction is varies from one social class group to another, but to at least some extent all children are exposed to this type of training. And it is in this manner that dental care comes to be defined as a ritual—something that needs to be done day in and day out, or each morning and night.

A ritual carries with it some intrinsic pleasures; these derive from its repetitive, partly unconscious nature. It becomes so habitual that not to perform the activity is a source of discomfort. There is evidence that one (but only one) of the main sustaining forces of dental care is associated with its ritual as-

pects (be it in the form of brushing, washing the mouth, massaging the gums, visiting the dentist). That is, it is a pleasure in and of itself coming at a regular time, involving the same movements, being a part of a larger habitual activity (such as getting up in the morning, going to bed at night); but not necessarily connected with the object of the activity, namely, healthy teeth.

Learning to take care of teeth is not an easy matter, either from the point of view of the parent or the child, as our present data suggest. It is a type of self-care that a child cannot easily observe (to some extent it occurs "within" a person), nor is it one that a parent can teach easily. This latter consideration reflects the observation that adults do not always know what the "right" dental care is, so that emphasis is put on the activity without too much concern as to whether it is being done in the best possible way in order to achieve certain results. Parents are more inclined to stress the repetitive nature of dental care rather than indicate the pleasures and objectives of this pursuit.

Much of this is to say that people, both children and adults, are never quite sure whether they are taking "good" care of their teeth. For one thing, results are manifested in a negative fashion and then only after some delay in time. If cavities are few, then the teeth have been properly cared for. Secondly, results are not as visible in this area as they are, for example, when a person combs his hair, washes his face or hands, and the like. Social recognition for this act is thus not easy to achieve. A parent can acknowledge that the child has performed the activity (or ritual), but he cannot assess the result. In this fashion, duty more than the attainment of good, healthy teeth comes to be emphasized in this area.

Related to this is that the results of dental care for the individual are essentially private—the feeling of a "clean mouth," the tactile pleasures associated with brushing, massaging, rinsing, tasting. These, too, are difficult to communicate or to acknowledge. The more mature feeling of "being clean" usually is not present among children. Without strong encouragement or reinforcement from parents, the gains to be derived from dental care are not especially clear for youngsters. Instead, children are more likely to be instructed in dental care practices in terms of the necessity for this type of activity and the implicit threats as to what might happen to them if it is not done.

When asked how they would go about teaching a four or five year old child how to care for his teeth, these are the types of responses we get:

> I'd tell them that you first rinse the mouth, then with a proper size brush demonstrate brushing—upwards and crossways. Also, massage the gums with the brush the same as the teeth. Tell a story of the consequences: toothache and he'll lose his teeth.
>
> (LM, Man, 54)

> I'd tell him he should keep his teeth clean or they would get bad and make him have sore teeth. If they get bad you have to go to the dentist to get them worked on so the teeth will be all well.
>
> (UL, Woman, 55)

In these remarks the uneasiness associated with how to go about teaching dental care is touched on. So, too, is the notion of threat: "if you don't take care of your teeth then you will have trouble with them." This, and other psychological considerations regarding teeth as mentioned in this chapter, carry over into adult life and strongly influence people's feelings about teeth and dental care. What some of these are and how they appear to result in dental neglect, is the subject of the following chapter.

COUNCIL ON FEDERAL DENTAL SERVICES

The dentist's military obligation

The matter of the military obligation confronting dental students and young dental graduates today is a problem concerning which the Council on Federal Dental Services has received numerous inquiries. The young men in the dental schools want to know where they stand, and the deans of the dental schools want to be able to tell the students what to expect. In the following report, an effort is made to trace the history of the legislative and administrative evolution of the military obligation of the dentist and to provide the latest available information regarding what a dental graduate may expect from the military.

LAWS AND REGULATIONS

In September 1950, because of the pressures brought about by this country's entry into the Korean conflict, the Congress of the United States, meeting in its 80th session, passed Public Law 779, the first doctor draft law. Public Law 779 required special registration of, and established special military liability for, persons trained in medical, dental and allied specialist categories. This liability extended to dentists up to age 51. On its expiration date in 1951, the provisions contained in Public Law 779 were reenacted and continued in effect until July of 1955. At that time, by Public Law 118, the 84th Congress reduced the age limit of liability to 45 for all registrants, and to 35 for persons who applied for a commission and were rejected on the sole ground of physical disqualification. This legislation was to expire on June 30, 1957.

On June 6, 1957, Senator Richard B. Russell, chairman of the Committee on Armed Services of the United States Senate, issued a report to the Senate on H.R. 6548, which contained proposed amendments to the Universal Military Training and Service Act. A quotation from that report should serve to illustrate the need for legislation permitting the induction of dentists. Senator Russell reported as follows:

> The Department of Defense has a requirement of 5,662 dentists. If this bill were not enacted, it is estimated that the number of dentists on active duty at the end of fiscal year 1958 would be 4,584; and at the end of fiscal year 1959, 2,998. In order to meet its requirement, there will be a needed input of dentists for the Department of Defense of 1,100 in fiscal year 1958 and 1,600 in fiscal year 1959.

(The figures quoted by Senator Russell may have been accurate at the time they were devised, but as shall be shown later in this report, a sharp decrease in dental officer requirements has occurred.)

On June 27, 1957, Public Law 62, of the 85th Congress, was enacted. This is the law presently in effect, and is the one which controls the military obligation of today's dentist. By the terms of Public Law 62, the military obligation of dentists was made commensurate with that of regular registrants under the Universal Military Training and Service Act. This is a goal toward which the American Dental Association had been working actively since the first doctor draft law was passed in 1950. The requirement of special registration was wiped out, and the age limit of liability reduced to 35 for those deferred on or after June 19, 1951, and to 26 for others not so deferred.

This legislation affected physicians and certain other allied specialist categories, but for purposes of clarity, only dentists will be mentioned in this paper from this point forward.

Other amendments of importance to dentists which were contained in the 1957 legislation are:

1. That no dentist will be inducted if he has applied for appointment as a Reserve officer and is or has been rejected on the sole ground of physical disqualification; the previous law provided that this should be so only for persons over age 35.

2. That any dentist qualified for a Reserve commission shall, so long as a need for his services exists, be given an opportunity to volunteer for active duty of not less than 24 months.

3. That the President may order to active duty for not more than 24 consecutive months any member of a Reserve component who is a dentist, who is under 35 and who has not performed at least one year of active duty in the Armed Forces.

4. That any such person called or ordered to active duty from a reserve component of the Armed Forces and who serves on active duty as a dentist for 12 months or more, shall upon release from active duty or within six months after release, be given an opportunity to resign the commission unless he is otherwise obligated to serve on active training and service in the Armed Forces by law or contract.

Some features of the former legislation which were retained in Public Law 62 are:

1. The statutory authority for the National Advisory Committee which was established in the original doctor draft act, for the purpose of advising the Selective Service System as to the dentists who should be called under the doctor draft act, taking into account the needs of the civilian population in the community from which the dentists would be taken. This advisory committee also has the authority to make recommendations with respect to the number of persons who should be in the residency training programs of the Armed Forces and to make deferment recommendations with respect to dentists who are faculty members or engaged in essential research.

2. Dentists may be appointed or promoted under Presidential regulations to a rank commensurate with their professional education and ability.

3. Dentists may be used in a professional capacity in an enlisted grade if they refuse to accept, or fail to qualify for, a commission.

The present Law will terminate on July 1, 1959. This date was inserted in order to coincide with the termination date of the Universal Military Training and Service Act which is the basic draft law. Early in 1959, or perhaps earlier, Congress must review not only the necessity for continuing the special authority with respect to medical, dental and allied specialists, but also the need to extend the regular draft law. In this connection, the American Dental Association was invited by Dr. Frank B. Berry, the assistant secretary of defense (Health and Medical), to attend a meeting at the Pentagon on March 7 of this year, at which consideration was given to what the various health professions and the military services think should be recommended to Congress in 1959. The Council on Federal Dental Services, which is the agency of the Association that is charged with the responsibility of developing policy recommendations in this area of dental interest, was represented at that meeting. Subsequently, at its next scheduled meeting, the Council will develop such policy recommendations as are deemed necessary for presentation to the House of Delegates of the Association at the 1958 annual session in Dallas, Texas.

On September 16, 1957, Department of Defense Instruction No. 1205.1 was issued, the subject of which was the implementation of the Universal Military Training and Service Act with respect to medical, dental and allied specialist registrants. Under this Instruction, the professional standard governing the ac-

ceptability of a dental registrant was outlined as follows:

A dental registrant will be considered professionally acceptable if he is engaged in the ethical practice of dentistry and—(1) he is a graduate of a dental school approved by the Council on Dental Education of the American Dental Association, or—(2) he is currently licensed to practice dentistry in a state or territory of the United States or in the District of Columbia or in the Commonwealth of Puerto Rico.

Exceptions may be made to the foregoing policy insofar as engagement in the ethical practice of dentistry is concerned if a dental registrant's case is being considered within one year after graduation from an approved dental school or while he is undergoing postgraduate instruction.

With respect to physical standards, the Department of Defense Instruction provides that all dentists are considered to be potentially acceptable for military service provided they can reasonably be expected to be productive in the Armed Forces. This policy permits the re-evaluation of certain dentists, who as a result of previous physical examinations have been classified as physically disqualified because of substandard physical findings.

The 1957 Instruction also provides for the determination of rank, based on the number of years spent in appropriate professional activities subsequent to graduation from dental school and prior to date of appointment as a commissioned officer. In this connection, the lowest rank to which a dentist can be appointed is first lieutenant in the Army or Air Force, and its equivalent in the Navy of lieutenant junior grade.

On October 17, 1957, the President, in accordance with authority vested in him by Public Law 62, issued Executive Order 10735 amending the Selective Service Regulations in order to provide the administrative framework for the implementation of the law. Some important excerpts from this Executive Order are:

1. Time spent on active military duty by dentists in student programs prior to receiving their professional degrees, or in intern training, shall not be counted in determining eligibility for exemption from induction as a veteran.

2. Any dentist who has been rejected for a commission as a Reserve dental officer on the sole grounds of physical disqualification shall be classified in Class IV-F as exempt from induction.

3. The Secretary of Defense may place separate calls for the induction of dentists with the Director of Selective Service, and such calls shall be filled by registrants qualified in this field.

4. Special draft calls shall be filled from among registrants who are dentists in the same manner that regular calls are filled by selecting them for induction in the following order: first, volunteers under age 26 in the order of volunteering; second, nonvolunteers between 19 and 26 who are not fathers, the oldest first; third, nonvolunteers between 19 and 26 who are fathers, the oldest first; and fourth, nonvolunteers over 26, the youngest first.

5. Registrants must notify their local draft boards of the receipt of their dental degrees within ten days after receipt of same.

ROLE OF ASSOCIATION

The accomplishment of this legislative evolution was achieved only after much concentrated effort on the part of the American Dental Association and its interested agencies. The stated position of the Association was that there was no justifiable reason for dentists to be the subject of legislation which made a man's profession the standard by which his draft liability should be measured. This special liability was fought consistently, with the eventual result that it was stricken from the draft law.

Today the doctor draft law is no longer a threat to the security of the civilian dental practitioner. It has become simply

a spur, the existence of which is intended to stimulate dental graduates to volunteer for commissioning upon graduation, or to participate in various programs established by the military services providing active duty while training. By June 1957 there were sufficient numbers of volunteers to meet the replacement needs of the Department of Defense for dentists during the fiscal year which began on July 1, 1957. Several factors had shaped this situation. For one thing, there were more dental graduates with a basic military obligation than ever before had existed. For another, the senior dental student and dental intern programs had proved successful. In addition to this, the efforts of the American Dental Association, and other professional health agencies, had produced career incentive legislation providing for extra pay for members of the health professions serving with the Armed Forces. This legislation had had a very salutary effect on the number of Reserve dental officers requesting extension of active duty status or appointment as Regular officers. Lastly, the reduction-in-force program initiated by the Department of Defense was cutting the over-all strength of the Armed Forces, thereby reducing the number of dental officers needed to care for the dental needs of the personnel of the military services.

APPLICATION OF PRESENT LAW AND REGULATIONS

Now the application of the present Law, Regulations and Instructions to the dental graduates of 1958 and 1959 will be examined.

In October 1957, a survey of the senior class was conducted by the Association's Council on Dental Education in cooperation with the Council on Federal Dental Services at the request of the Department of Defense. The questionnaire employed asked for certain information regarding the senior dental students' military obligation and service preference. The results of this Senior Dental Student Survey were turned over to the Department of Defense for compilation of the data presented.

The Council on Federal Dental Services recently received a letter from the Deputy Assistant Secretary of Defense (Health and Medical), in which the following information was provided: questionnaires had been received from 3,013 seniors. An analysis of the information provided showed 995 senior students to be either ineligible for allocation to one of the military departments or desirous of entering the U.S. Public Health Service. In addition there were 183 students with IV-F classifications, most of whom probably would be disqualified for physical reasons from military service. The remaining 1,835 students were allocated to the three military services, in accordance with the preference indicated on each student's senior dental student questionnaire. The Department of Defense advises that only about 50 per cent of this group will be commissioned and brought to duty, voluntarily, to fill the needs of the military services for the fiscal year beginning July 1, 1958. Since approximately 550 seniors have already associated themselves with one of the military departments, only about 325 remain to be procured.

The Council has been informed that all of the 1958 graduates who have been allocated to one of the military services have been advised of this fact, and that those who will be offered commissions will be receiving application packets shortly.

Those who will not be tendered commissions will be so advised as soon as possible. The group to be commissioned may anticipate being called to active duty within 60 days after graduation unless a later date is requested by the student. In addition, the 1958 graduates should be informed of their date of entry onto active duty about 60 days prior to graduation.

Those who have been tendered commissions who do not receive this information by graduation should contact the Council on Federal Dental Services of the American Dental Association or write directly to the Surgeon General of the military department to which they have been allocated. All persons and agencies involved in this voluntary procurement program are anxious to avoid a repetition of an unpleasant circumstance which has occurred in the past, in which a graduate would be commissioned and then left in a sort of limbo, not knowing when, or even if, he would be called to active duty.

The American Dental Association has been able to secure from responsible officials of the Department of Defense assurances that students who apply for a commission, but cannot be given one because of limited military dental strength authorizations, will not subsequently be brought to active duty through the draft board unless total mobilization should occur.

Students who desire to fulfill their military obligation immediately after graduation, should accept a commission if one is tendered and if at the time it is tendered they are informed that they will be called to active duty upon graduation or shortly thereafter. By so doing, they will be controlling their time of entry into military service, so that it best fits their personal schedules. In addition, they will be enabled to select the particular branch of the Armed Forces in which they desire to serve. It is unlikely that either of these privileges would be afforded them if they had to be drafted to serve their military obligation.

If they are not tendered a commission, they can forget about the possibility of a call to service in the military establishment. As long as the volunteer program is successful—and indications are that it will continue to be successful—the doctor draft law will never be activated. They can go into practice without fear of subsequent interruption to serve their military obligation, unless a national emergency arises.

Service in one of the military dental corps for two years can have many advantages for a young dentist. A great deal of practical professional experience under the supervision and guidance of older practitioners can be gained because of the tremendous pool of clinical material presented by active duty personnel. Also, military pay for dentists is now very good, and will be even better if the proposed legislation presently under consideration by Congress is adopted. By exercising a reasonable degree of thrift while in the service, a young dentist can, by the time he receives his discharge, accumulate a substantial sum which will prove most helpful in the establishment of a private practice in the civilian community. Finally, an excellent opportunity is afforded to see the country and possibly the world, at no expense to the dentist.

SUMMARY

To summarize, all dentists who are between the ages of 18½ and 35 have a military liability under the basic draft law and are liable for induction under the present doctor draft law. Because of his status as a member of one of the health professions, a dentist is statutorily guaranteed a commission if called to duty. It is believed that the best time to fulfill this military obligation is immediately after graduation from dental school, before attempting to establish a private practice which might be interrupted at a later and highly inconvenient time.

By volunteering for active military service immediately after graduation, the young dentist can control his time of entry onto active duty, and can choose with limitations, his preferred branch of service. If his application for a commission is accepted, he should be notified of his date of entry onto active duty about 60 days before graduation. That date, with few exceptions, should be within 60 days after

graduation. If he is not notified of his projected date of entry onto active duty by the time graduation draws near, he should contact the Council on Federal Dental Services of the Association or write directly to the Surgeon General of the military department concerned. If, after he volunteers, a commission is not forthcoming because military strength authorizations have been filled, he may enter into the practice of his chosen profession with confidence, knowing that he no longer needs to be concerned about his military obligation.

COUNCIL ON DENTAL RESEARCH

Dental societies and radiation hygiene

The immense amount of information—and misinformation—which has appeared recently in the daily press and popular magazines regarding the genetic dangers of x-rays, including dental x-rays, has caused a number of dental societies to investigate the situation within their communities. Recently, three local dental societies, widely separated from each other, report efforts to reduce radiation exposure from dental x-ray machines.

The Council on Dental Research is indebted to John H. Huschart for his report of the study being made in Cincinnati, Ohio, to Leonard F. Menczer for his account of the Hartford, Conn., x-radiation program, and to Robert J. Nelsen for the Southern Maryland account.

CINCINNATI, OHIO, STUDY

The Cincinnati Dental Society is planning a city-wide study of dental x-ray machines and an installation of lead diaphragms and aluminum filters on all machines where indicated. This program is being carried out in close cooperation with the Advisory Committee on Radiation of the Cincinnati Board of Health, the Mayor's Radiation Legislation Advisory Committee, and the Kettering Laboratory. It is being conducted under the special guidance of Dr. Mitchell R. Zavon of the Occupational Health Section of the Cincinnati Health Department. The major Cincinnati dental dealers have pledged their cooperative assistance.

Preliminary plans call for the issuance of film badges as a method of demonstrating the benefits of the program.

Cincinnati is believed to be one of the first cities to develop its own radiation exposure control committees, and the Cincinnati Dental Society is believed to be among the first component dental societies to inaugurate a program for the purpose of improving the safety and effectiveness of roentgenology.

HARTFORD, CONN., STUDY

Because of the desirability of reducing radiation exposure from the dental x-ray machine, the Hartford Health Department undertook what it termed "Operation: dental x-ray filtration"—a project whereby every dentist of the Greater Hartford area was offered the necessary aluminum disk and lead diaphragm, free of charge, for his x-ray unit or units.

The many manufacturers of dental x-ray equipment provide today a circular disk of aluminum of varying thickness which fits either into the pointer cone or

the head of the x-ray machine itself. This aluminum disk will filter out approximately 50 per cent of the short, soft rays that are least effective in roentgenography and most harmful to the soft tissues of the body. The lead diaphragm, inserted in a similar way, narrows the diameter of radiation exposure of the patient's face; that is, where an area of about five to six inches in diameter was exposed, it would be reduced to an area three inches in diameter, and, of course, with the use of ultra-fast film, the total exposure can be reduced even further.

With a minimum of effort on the part of the dentist and an expenditure of what can be counted in pennies, the average patient seeking dental care need not be exposed to more than, perhaps, 20 to 30 per cent of the radiation he is presently receiving without these precautions.

When this offer was made to the dentists of Greater Hartford—approximately 300 of them—replies were received from approximately two thirds within a three week period, and in subsequent weeks as many as three fourths of the total dentist population made requests for these adjuncts for their x-ray units.

It is recommended that every community, either through its local health department or dental society, undertake a similar project in order to insure a maximum of roentgenological safety to dental patients.

SOUTHERN MARYLAND DENTAL SOCIETY PROGRAM

Believing that the best way to get anything done is to "Do It Yourself," the Southern Maryland Dental Society has distributed an instruction folder on x-ray protection to each of its members. The folder contains aluminum filters and complete directions as to how the dentist can modify his own x-ray machine so that it will have the proper amount of filter and will meet other requirements of modern dental roentgenography.

The pamphlet contains four 0.5 mm. disks of pure aluminum which the dentist can place as additional filter in his x-ray machine, if necessary.

Other suggestions relating to good roentgenographic practice are included along with a listing of recent articles appearing in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION which are concerned with the subject of x-ray protection.

The pamphlet was designed by Robert J. Nelsen of Rockville, Md. He is the official representative of the American Dental Association to the National Committee on Radiation Protection.

Supplement to the list of certified dental materials

ADDITION • Since publication of the most recent List of Certified Dental Materials, Revised to December 1, 1956 (J.A.D.A. 54:130 Jan. 1957), the following material which conforms to American Dental Association Specification No. 6 for Dental Mercury has been added.

CERTIFIED DENTAL MERCURIES
(A.D.A. SPECIFICATION NO. 6)

Mercury	*Manufacturer or distributor*
Triple Distilled Mercury	Eastern Smelting & Refining Corp.

COUNCIL ON DENTAL HEALTH

The "why" and "how" of a state working conference on dental health

John K. Phelan, D.D.S., Albuquerque, N. M., and David F. Striffler,† D.D.S., M.P.H., Santa Fe, N. M.*

The Council on Dental Health presents the following report for the purpose of providing guidance to other state dental societies in the conduct of dental health working conferences. The Council has held a dental health conference at the national level annually since 1950 and, for the past three years, has attempted to stimulate the development of its counterpart at the state level as an instrument for improving the programs of state societies and their councils on dental health in the areas of dental care and dental health education.

The report was prepared at the request of the Council.

"Dental health conferences belong to the professional public health people."

"We attend dental meetings to learn new technics to take home—this workshop business is different."

"This sounds like a fine idea."

"You fellows are just going up there to have a good time."

Such were the comments when the plans for the First New Mexico Working Conference were broached in New Mexico by the council on dental health of the New Mexico Dental Association. Initially, even among some council on dental health members themselves, there was considerable skepticism (and some enthusiasm) when this type of workshop meeting was first discussed some years ago, but despite their mixed feelings they were willing to try it.

Should state dental associations attempt to hold workshops or conferences on dental health? If so, what should be the objectives of such conferences? How should they be conducted? This report describes one such conference, the First New Mexico Working Conference on Dental Health: why and how it was held, and the values derived.

WORKSHOP CONCEPT

The idea of a conference or workshop type of meeting for New Mexico was stimulated by the Second Idaho Dental Workshop (held in May 1956), the First Texas Workshop on Dental Health (December 1956), the Missouri Council on Dental Health and District Officers' Conference Workshop (January 1957) and by the many outstanding workshops which have become a regular association activity in Tennessee. The terms "workshop" and "working conference" have been applied to what is really an ancient study technic more recently revived by education groups.[1] The "workshop" has been defined[1] as:

> . . . a professional seminar which provides for a larger measure of analytical thought and self expression than is offered in the traditional dental meeting. Some of the features of the panel and forum methods of discussion, which

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1. Gruebbel, A. O. Workshop technic as a method of study in dentistry. J.A.D.A. 36:1 Jan. 1948.

give all members of the group an opportunity to participate, are used. In addition, the workshop offers a laboratory setting and develops an atmosphere favoring cooperative work on the part of its members. The principal aims of a workshop are to provide full opportunity for a presentation of essential information, to analyze specific problems and to formulate conclusions.

How can the general practitioner be stimulated to attend this type of meeting? There are many reasons why he will not be interested. It is only after he has attended a good workshop and found out for himself that he will become an enthusiastic supporter of this problem-solving technic.

PLANNING AND FINANCING

In planning a workshop for the first time, a number of questions should be considered. Will skepticism play an important part in lowering the hoped-for attendance? Should there be a registration fee? Will the state association help finance the conference? What assistance can the state health department provide? All of these questions—and more—were discussed at the first workshop planning meeting of the New Mexico Dental Association's council on dental health held some ten months in advance of the Conference. Members of the council decided that it would be a mistake to eliminate the registration fee in order to bolster attendance. They had enough confidence in New Mexico's 214 dentists to risk a $20 registration fee. Then, too, there was some subsidy available through the W. K. Kellogg Foundation, and a reserve fund available from previous postgraduate dentistry seminars. In February 1956 the New Mexico Department of Public Health had received a grant from the W. K. Kellogg Foundation to stimulate (and evaluate) continuing education programs for the dentists of New Mexico. This Working Conference was the fourth project under the grant. The first three were formal academic seminars. All four activities have been sponsored jointly by the Foundation, the New Mexico Department of Public Health, the New Mexico Dental Association, and the University of New Mexico.

Approximately $1,250 was budgeted. This amount included honoraria, travel expenses, and room and board for the lecturers and panelists, and kits and resource materials. Of course, considerable money was spent by individual council members on telephone calls and postage. The Department of Public Health expenditures in terms of printing, paper, personnel time, and transportation were not included in the budget nor expenditures. All in all, about $1,300 was spent on the Conference in a direct accountable outlay of money. Registration fees brought in about $820.

At its first planning meeting in December 1956, the Council divided itself into committees: program; host and hospitality; publicity; local arrangements, housing, and registration; and finance. At the outset basic Conference policies were determined: (1) the Conference would be held at an isolated mountain guest ranch; (2) advance registration would be mandatory; (3) program planning would be guided by the observations of an interest inventory; and (4) a definite date for the Working Conference was set (September 12-14, 1957).

PROGRAM

The program committee devised and mailed out a questionnaire through the Division of Dental Health, New Mexico Department of Public Health, to the membership of the association, suggesting subject areas which might be discussed. Space was left for additional suggestions and comments. About 40 per cent were returned. Of those returned, two thirds indicated an interest in this type of meeting and planned to attend; one quarter indicated interest but could not attend; and 8 per cent were not in-

terested. The questionnaire was sent out in March, and the following month the program chairman with the help of the rest of the council outlined a tentative program and time schedule. From the questionnaire it was clear-cut that the first topic preference was "public relations," second was "group dental care plans," and third choice was "legislation."

OBJECTIVES

The council's objectives in holding the Conference were manifold and included:

1. To provide New Mexico dentists with an opportunity to experience the workshop technic as a medium for identifying and solving group problems and as a group-learning process.

2. To provide an informal setting free from extraneous distractions where (a) dentists from various parts of the state could become acquainted by living, working, and talking together, (b) New Mexico dentists could become acquainted with the various resource people, and (c) all could share experiences and profit thereby.

3. To acquaint the New Mexico dentists and the resource people with each other's viewpoints and achieve a mutual understanding; to clarify the misunderstandings and misconceptions of each group.

4. To sensitize the dentists of the state to social changes, present and past, which affect dentistry.

5. To create fuller awareness on the part of dentists of their professional responsibilities and obligations to the public.

6. To provide adequate time to discuss dental health problems apart from the hurly-burly of an annual convention or "telephone or mail votes" of a committee.

7. To stimulate increased participation by individual dentists in their dental association, in dental public health, in public health, and in community activities.

8. To alert the profession to the growth of group dental care plans such as Medicare insurance and union welfare benefit plans; budget payment plans, and other methods of payment for dental care, and to set the stage for the discussion of association policies and programs in this regard.

9. To enable New Mexico dentists to take an objective view of the dental profession in New Mexico in its relations with the public, the legislature, and the press, and to recommend positive action steps which the profession could take to improve these relations; to take a good look at itself through the eyes of the panelists, lecturers, and resource people.

On the basis of the topics selected, the program committee began to secure lecturers, panelists, and resource people. Those selected were sent follow-up letters on an almost monthly basis beginning in June. The program committee, in its preliminary invitation to panelists, lecturers, and resource people emphasized that frankness, candidness, objectivity, and constructive criticism were expected from them.

Possibly too many topics were discussed at this Conference. Perhaps it should have been on only one subject. However, the three topics were chosen because they were so closely related and so close in preferences indicated by the preconference questionnaire.

For the first evening of the Conference, as a warm up and kickoff, a representative private practitioner from another state which had had successful working conferences was chosen to give the keynote talk. He was to discuss the purposes and methods of workshops and how they had worked in his state, as well as the obligations of dentistry as a profession.

In the area of public relations, it was decided that, rather than getting a "publicity expert," someone familiar with dentistry (but not necessarily identified with

dentistry) would give the keynote talk on this subject. Hence, a professor of public health economics with a doctorate in social psychology was selected. His assignment was to be candid and frank in his assessment of the dental public relations in New Mexico and not to "pull any punches." He was also to give the dentists an objective viewpoint as might be seen by someone on the outside looking in.

The lecturer on group dental care plans was selected because he did have the viewpoint of dentistry, was a dentist, and could, from this standpoint, impress the group with the social forces which have worked to bring about group dental care plans.

For the legislative section it was decided to hold a panel discussion of representative legislators and others who might be able to present, frankly and candidly, dentistry's legislative problems.

THE SETTING

The local arrangements and housing committee began the important task of finding a guest ranch which would be suitable. From several possibilities, the Lazy Ray Ranch, 80 miles from Santa Fe and Albuquerque, located high in the Jemez Mountains, was secured at the out-of-season rates of $11 a day per person, or $22 for two nights, including six meals, a social hour, gratuities, and coffee breaks. In July a tentative program was sent out and advance registration was solicited. By September, 40 New Mexico Dental Association members, about 20 per cent of the total membership, had registered. Some of the advance registrants failed to attend but others took their places. All in all, 42 members and 24 resource people participated in the Conference. Every member of the Board of Directors of the New Mexico Dental Association participated, as well as many key dentists (for example, various committee chairmen and members of the Board of Dental Examiners). The directors' participation was assured by the fact that the Association president called a meeting of the Board of Directors immediately following the close of the Conference. Also, a personal letter was sent by the chairman of the council on dental health to key dentists throughout the state "requesting," not "inviting," their attendance.

MECHANICS AND SCHEDULING

Since there was a "captive audience," the program committee scheduled early breakfasts (7 A.M.) and early meetings each day (8 A.M.). In all of the literature mailed out it was emphasized that this was a working conference. The program was arranged so that in each of the three subject areas there would be a stimulating, preparatory lecture or panel presentation before the general assembly broke into discussion groups. A half day was devoted to each area. Specific questions were assigned to each group in order to preclude rambling, general discussion and to prestructure the discussion somewhat.

A professional in the field of group processes was secured from the health education division of the New Mexico Department of Public Health to serve as Conference director and to moderate the one panel. Just before the Conference began, the director oriented the carefully selected group leaders and recorders in their duties and in the resource people and materials available. He met with them periodically during the Conference. The novice recorders and leaders felt that this instruction was most helpful.

The resource people were assigned to a group on the basis of their special knowledge so that they were spread as fairly as possible among each of the four discussion groups. It was decided that individual discussion groups should be comprised of no more than 15 persons, including resource people, leaders, and recorders.

Kits of background information materials in each of the subject areas were assembled and presented to each participant at the time of registration. Thanks are due to the various bureaus and councils of the American Dental Association for their help in assembling these materials.

The division of dental health of the New Mexico Department of Public Health played much the role of a catalyst so far as the Working Conference was concerned. As noted before, the Department provided the person experienced in group processes to serve as Conference director, and the Department's public relations director served as a resource person. The Department also furnished automobiles for transportation of out-of-state guests from the airport to the meeting. Before, during, and after the Conference, the Department provided secretarial services and duplicating facilities for printing the programs and reporting the Working Conference. The director of the division of dental health, although not a voting member of the council on dental health, has been appointed as its secretary. Since he attends most of the council meetings, he was involved in the planning for the Conference. The Department of Public Health also collected the background materials for the resource kits and, where necessary, duplicated these materials.

The Department's objectives in working closely with the Conference were practically identical with those of the association and the council on dental health, but perhaps the emphasis was different. The Department of Public Health was concerned in securing support from such a responsible group as a state dental association for public health activities in general, and dental public health activities in particular. Also, the Department wished to re-emphasize or bring to the association's attention certain problems faced daily by the Department's personnel. Some of these problems include the provision of dental care in remote areas, the provision of dental care for children, and the recruitment of dental hygienists and dentists, including scholarship loan funds therefor. The Department's concern was chiefly the same as that of the council on dental health: to provide an opportunity, through the workshop technic, for the dentists of the state to get together with various resource people in order to identify problems and work positively towards their solution. The Department felt that its efforts, in terms of time, personnel, and money, were well spent.

EVALUATION AND FOLLOW-THROUGH

From the Conference came many recommendations for action. It should be noted, too, that throughout the Conference the workshop director emphasized that recommendations for definite action steps should be encouraged by the group leaders and recorders whenever possible. A final evaluation of the success of the Conference will depend on how well these recommendations are implemented. The recommendations were pooled into a final report which was acted on in concert by the entire assembly. These recommendations were only those of the Conference and do not reflect official action by the state association or its officers. However, the Board of Directors of the New Mexico Dental Association met immediately at the close of the Conference while they were still at the ranch and did take action on several items. Most noteworthy, probably, is that they did employ a public relations counsel for the association.

The Conference was evaluated by a professor from the University of New Mexico (as part of the obligation to the W. K. Kellogg Foundation), by direct and indirect "on the spot" questioning, and by a subjective written questionnaire completed by the participants. His pre-

liminary observations indicate that the workshop technic was successful and worthwhile.

The rank and file of New Mexico dentists who examined the problems and made suggestions for correcting them were delighted by the experience. Most of these men can be counted on to help implement the recommendations. A fresh approach through new methods was applied to old problems—some that previously had been considered hopeless. The association officers were gratified to find many new faces on whom they could rely in the future.

In the opinion of many, the good publicity and public relations which emanated from the Conference were worth the total cost. Many of the resource people attending from within the state—highly regarded citizens with a certain amount of influence—received an insight into the problems of dentistry and can be considered as friends: no small asset.

Comments of some of the out-of-staters and some of the legislators present indicated that they were surprised to find that here was a group of dentists who were willing to listen to criticism, and even to criticize themselves, in hope of being able to perform better services for the public. One of the state's political newspaper columnists said, as he left early: "If I had known that these dentists were going to do anything like this—that is, really work, really get self-critical, really try to improve the profession and health of the people of the state—I would have been up here for the full three days." In summing up, it is doubtful if anyone who wasn't there could fully appreciate the camaraderie and *esprit de corps* of the group that was there. Nor could anyone who was there really get across exactly what happened and what a good feeling he had about the Conference to someone who wasn't.

Shortly after the Conference, the council on dental health met to work out plans for following through on the Conference recommendations — particularly those recommendations to the council. Also, the method of reporting was decided: that an immediate report go out to all participants and that a more detailed report,[2] with the formal papers of the lecturers[3] included, be published in the next issue of the *New Mexico Dental Journal*. The council also discussed plans for sponsoring another workshop next year specifically on "legislation"—immediately after the election of the legislators and just prior to the next session of the legislature.

And so it can be seen that from one conference, there comes another; this time, instead of generalized, one aimed at a specific problem and program.

SUGGESTED ADDITIONAL READING

1. American Dental Association, Bureau of Dental Health Education. Planning dental health conferences. Chicago, American Dental Association, 1955.

2. Idaho Board of Health, Division of Dental Health. Proceedings of the second dental health workshop of the Idaho Dental Association. Boise, Idaho Board of Health, 1956.

3. Conferences that work. Adult Leadership 2:1 May 1953.

2. First New Mexico working conference on dental health. New Mexico D. J. 8:9 Nov. 1957.

3. Metzner, C. A. The elements and an application of the principles of public relations. New Mexico D. J. 8:33 Nov. 1957.

BUREAU OF LIBRARY AND INDEXING SERVICE

Film Library

The films, "Pain Control in Children's Dentistry," and "Cosmetic Reshaping of the Natural Teeth," reviewed in this article, have been acquired recently. They are available for rental ($2.50 each) from the Film Library, American Dental Association, 222 E. Superior St., Chicago 11. Both are subjects of interest to the general practitioner. Additional films and slides on other subjects are listed in the booklet, *Audio-Visual Materials in Dentistry,* and its two supplements, which are available free of charge from the Film Library.

FILM REVIEWS

Pain Control in Children's Dentistry • 16 mm., color, sound, 33 minutes. Produced in 1956 by Jerome L. Fechtner, D.D.S. Photography by producer. Purchase arrangements can be made with the producer at 225 N. Martine Ave., Fanwood, N. J.

The film opens showing the waiting room which is decorated with photographs of former child patients. The importance of attractive physical surroundings and friendly personnel are emphasized. Prior to any dental care in which an analgesic is used, the dental hygienist acquaints the child with his environment, makes roentgenographic examination and explains correct toothbrushing to him.

The next sequences show how the operator administers an analgesic to several children aged from 2½ to 12. The reasons for certain technics are explained to the audience through a dental colleague who is present in the dental office throughout the film. The dialogue, which is synchronized with the pictures, appears to be spontaneous. Actual case reports are illustrated.

Since this is one of the few films to date that reveals the child patient's reactions to an analgesic, it is significant. The technics may be controversial but they will interest the general practitioner. Dental societies and study clubs may find the film provocative.

Cosmetic Reshaping of the Natural Teeth • 16 mm., color, sound, 23 minutes. Produced in 1957 by J. Bruce Rushton, D.D.S. Photography by Robert H. Planck, A.S.C. Can be purchased ($150) from producer, 415 Camden Dr., Beverly Hills, Calif.

This film portrays the reshaping of anterior teeth for the purpose of improving the appearance of the patient. Although incidental to the main topic, the incisal bite of most of the patients shown is vastly improved. Teeth which are too long are shortened; those which are rotated are made to appear straight and some that are chipped or jagged through wear are blended to an harmonious appearance. The use of optical illusion through change of highlight is illustrated. The operator explains each step and supplements them with before and after photographs and study models. High speed equipment is used. The various wheels and disks used in the work are shown as well as the marking of study casts.

The importance of the dental assistant as auxiliary personnel is shown.

This film is well organized and suitable for the general practitioner. The manner of presentation and the narration give it a semblance of a table clinic. The photography, especially the intraoral closeups, is good. Some of them are magnified to such a degree that three teeth fill the entire screen. Dental societies, study clubs and the Armed Forces personnel will find it suitable program material.

COUNCIL ON DENTAL THERAPEUTICS

Prescribing supplements of dietary fluorides

The Council on Dental Therapeutics has received many inquiries from dentists and physicians concerning the administration of dietary fluorides on an individual or prescription basis. In many instances, the practitioner wishes to begin immediately to provide the dental benefits of fluoride for his children or the children of patients who do not have access to drinking water with an optimum level of fluoride.

It should be emphasized that prescribing fluoride supplements is not a substitute for community fluoridation programs. Fluoridation of a municipal water supply ensures the availability of adequate dietary fluorides to all children who reside in the area served by the water system. Fluoridation is a classic example of a public health procedure since it serves the entire population, requires no conscious and sustained effort on the part of the individuals within the community and automatically restricts individual consumption of the fluoride supplement to levels which have been shown to be safe. There is increasing evidence also that some protection is provided for teeth which erupted prior to the use of the fluoride-bearing water.[1] This finding suggests that continued use of the fluoridated water provides additional benefits perhaps through contact with teeth surfaces.

None of the procedures for individual administration of fluoride supplements completely duplicates the situation which exists when the entire community water supply contains fluoride at the optimum level. It is not certain, therefore, that a child will receive as much benefit through conscientious use of prescribed fluoride as through residence in a community where a fluoridation program is in operation. Cost per child in the use of individual preparations is much greater than the pro rata cost of a community fluoridation program. The results of limited observations suggest that only a small proportion of parents will continue the conscientious administration of fluoride supplements to children over the long periods required in the development of caries-resistant teeth.

Certain potential hazards not associated with a community fluoridation program may attend the individual use of fluoride supplements. It is the opinion of the Council that concentrated forms of dietary fluorides should be available only on a prescription basis because the safe and effective use of these preparations requires professional supervision. The careless storage of concentrated fluorides in the home could result in accidental poisoning of children. A further potential hazard is the possibility of careless or improper administration of excessive amounts of fluorides to young children over a protracted period of time, especially where the drinking water contains a significant concentration of fluoride. Resulting dental fluorosis would not be detected until the eruption some years later of the teeth that developed at the time of excessive fluoride intake. Because of their possible misuse and probable ineffective use, except under careful professional supervision, the Council strongly advises against the indiscriminate distribution of dietary supplements of fluorides.

In spite of these limitations in their use, it may be desirable to prescribe fluoride supplements for young children

1. Hayes, R. L.; Littleton, N. W., and White, C. L. Posteruptive effects of fluoridation on first permanent molars of children in Grand Rapids, Michigan. Am. J. Pub. Health 47:192 Feb. 1957.

in selected instances where there is strong motivation on the part of the parent and a clear realization of the need for careful regulation of the daily intake. This conclusion is based largely on presumptive evidence, but it is also supported by observations in a limited number of children who were given tablets of sodium fluoride and examined over periods of time sufficient to reveal any indications of dental fluorosis and sufficient to provide suggestive evidence of the development of caries-resistant teeth.[2]

It is the opinion of the Council that the following principles should be observed in the use of dietary supplements of fluorides:

1. Concentrated fluoride preparations should be dispensed only on prescription in order that adequate supervision may be provided for their safe and effective use.
2. Supplementary fluorides should be prescribed only when the concentration of fluoride ion in the drinking water is known and is less than 0.7 part per million (ppm).
3. Dietary fluoride should be continuously available throughout the period of tooth formation.
4. No more than 264 mg. of sodium fluoride should be dispensed at one time.
5. Concentrated fluoride preparations should bear the warning statement: "CAUTION: Store out of reach of children."
6. Prescriptions should be limited to those instances where the parent may be expected to follow directions carefully.

Use of a bottled water containing 1 ppm fluoride ion has been suggested as most feasible during the first two years of life when substantially all drinking water is provided at home. This water is used also for the preparation of formulas and other food. Bottled fluoride water should meet established standards of sanitary and other quality control.

Fluoride tablets may be employed with least difficulty in localities where the drinking water is substantially devoid of fluoride. The following prescription illustrates their use:

℞ Sodium fluoride tablets 2.2 mg.
Dispense 100
Label: Use according to written directions
CAUTION: Store out of reach of children

Written directions should be provided according to the age of the child as follows:

(1) Before two years of age. Add one fluoride tablet to each quart of water used for drinking purposes and for the preparation of formulas and other food.
(2) From two to three years of age. *Every other day* add one fluoride tablet to an amount of fruit juice or drinking water which the child will consume at one time.
(3) After three years of age. Administer one tablet *each* day in an amount of fruit juice or drinking water that will be consumed at one time.

Prescriptions of fluoride solutions may be used more conveniently in a locality where the drinking water contains a known significant level of fluoride but less than 0.7 ppm. The prescription below which specifies 0.132 Gm. of sodium fluoride is written for use when the drinking water is devoid of fluoride. However, the amount of fluoride may be adjusted downward by 10 per cent for each 0.1 ppm of fluoride ion in the drinking water. Thus when the level in the drinking water is 0.6 ppm, the amount of fluoride in the prescription will be reduced by 60 per cent, that is, to 0.053 Gm. Similarly at a level of 0.4 ppm the amount of sodium fluoride would be 0.079 Gm. and at a level of 0.2 ppm, the prescription would specify 0.106 Gm.

℞ Sodium fluoride 0 | 132
Distilled water, to make 240 | 0
Label: Use according to written directions
CAUTION: Store out of reach of children

Written directions should be provided according to the age of the child as follows:

2. Personal communication from F. A. Arnold, Jr.

(1) Before two years of age. Add one teaspoonful to each quart of water used for drinking purposes and for the preparation of formulas and other food.

(2) From two to three years of age. *Every other day* add one teaspoonful to an amount of fruit juice or water that the child will consume at one time.

(3) After three years of age. Each day add one teaspoonful to an amount of fruit juice or water that the child will consume at one time.

The prescriptions illustrated in this report have the advantage of simplicity and this factor may encourage the more conscientious use of the supplements. In the opinion of the Council, any other prescription procedure should also conform to the principles outlined in this report. When the drinking water is substantially devoid of fluoride, the aim is to provide supplements of about 0.5 mg. of fluoride ion per day for children from two to three years of age and about 1.0 mg. per day beyond three years of age. As noted earlier in the article, these amounts should be reduced appropriately in prescriptions issued for children who live in areas where the drinking water contains fluoride ion at levels of 0.2 to 0.7 ppm. The local or state department of health may be able to provide information concerning the fluoride levels of water supplies in its area.

Since it appears that dietary fluoride provides its greatest benefit during the period of tooth development, one may assume that the child should receive adequate fluoride until at least 8 to 10 years of age. By this age, the crowns of all teeth but the third molars should be completed and about half of the permanent teeth will have erupted.

No evidence is available to the Council to support the claim that prescription use of fluoride will provide dental benefits in adults.

In its classification program, the Council on Dental Therapeutics will now give consideration to products containing sodium fluoride to be prescribed for use as dietary supplements. These products will be evaluated in accordance with the standards established in this report and in the Council's *Provisions for the Acceptance of Products.*

Tablets containing fluorides in the form of calcium fluoride or bone meal have been classified in Group D[3] (unacceptable) because it appears difficult or impossible to provide an accurately controlled level of "effective" fluoride for the patient through the administration of these slowly soluble fluoride products.

3. Current status of dental uses of fluorides, J.A.D.A. 45:468 Oct. 1952.

BUREAU OF DENTAL HEALTH EDUCATION

Cooperation in local health programs

Alert local dental societies find many opportunities to participate in community health programs. These societies participate even though the program has nothing to do directly with dental health. Supporting other health programs invites cooperation from members of those groups when dental health programs are planned.

Two nationally sponsored health programs with which dentists should be familiar and in which they may wish to participate are the School Health Program of the National Congress of Parents and Teachers and the Junior Chamber of Commerce Community Health Programs.

Most dental societies are familiar with the Summer Round-up program of the P.T.A. The National Congress of Parents and Teachers has now expanded this program to include the continuous health supervision of all school children.

The dental profession has long recognized the need for a program of continuous dental supervision. The present program of the P.T.A. is one, then, which will do much to re-emphasize the principles of the continued observance of good dental health practices.

To be effective, the health programs of local P.T.A.'s need the assistance and guidance of the dental and medical professions. As professional people and as members of P.T.A.'s dentists have a responsibility for providing leadership and direction in such programs as will affect the dental health of children.

The United States Junior Chamber of Commerce, with the cooperation of the National Health Council, is again sponsoring the Junior Chamber of Commerce Community Health Programs project.

A set of 10 program guides has been developed and is available from the National Health Council, 1790 Broadway, New York 19. Local Jaycee chapters will also be receiving information on the community health program project.

Although none of the ten programs deals specifically with dental health, several of them lend themselves to the inclusion of dental health matter. These are: Health Fairs, Adventures in Living for Older People, Help for Handicapped Children and Jaycee Health Forums. There is nothing to prevent the local Jaycees from selecting a different health topic such as "fluoridation of the community water supply."

As members of the local health team, dentists in communities where there are Jaycee chapters should familiarize themselves with health activities of the Jaycees and encourage participation in the Community Health Programs effort. If dental health is part of total health, then certainly dentistry must lend its cooperative effort to any health program the community feels is important.

Book Reviews

BIOCHEMISTRY

By Abraham Cantarow and Bernard Schepartz. 867 pages with 151 illustrations and 77 tables. Index. $12. Philadelphia, W. B. Saunders Co., 1957.

This text book of biochemistry, written especially for first year medical students, contains 29 chapters with topics arranged in the conventional manner. The contents of each chapter have been brought up to date, and the subject is presented in an interesting manner.

Many of the topics normally covered in any course in biochemistry are explained on a kinetic or thermodynamic basis, and for precise explanations, mathematics involving calculus is a necessity. It is obvious that the required premedical training does not prepare a student for a more thorough discussion of proteins, enzyme action, biological oxidations, and energy transfer. The authors have handled these topics remarkably well. The presentations are given with clarity despite the sparing use of all but the most simple mathematics.

Either a first year medical or first year dental student, with the required preprofessional training, can master the contents of this book and perhaps have a much better understanding of the science than if it were presented in a more rigorous manner.

The entire book is well written, each topic is adequately covered, there is a paucity of errors, and the material is presented in such a manner that the normal student can grasp it readily. It is an excellent biochemistry text for first year medical or dental students.

L. S. Fosdick

HEALTH MANPOWER SOURCE BOOK; 8. DENTAL HYGIENISTS

By Walter J. Pelton, D.D.S., M.S.P.H.; Elliott H. Pennell, B.S., and Helen M. Vavra, B.A. 87 pages with 54 tables and 9 graphs. 50 cents. Washington, D. C., U. S. Government Printing Office, 1957.

This publication is a compilation of virtually all data available concerning dental hygienists. It is a paper-bound booklet, eighth in a series of health manpower publications of which the seventh deals with dentists.

A brief history of the dental hygiene movement is presented, beginning in the first decade of the twentieth century. This is followed by a detailed statistical analysis of graduates of dental hygiene schools, showing an increase from 31 graduates in 1914 to 902 in 1956. There are also useful sections on state licensure and on total professional resources.

Of particular interest is the section entitled "Dental Hygienists in 1954," which presents the results of a mail survey of dental hygienists. Topics covered in the survey include employment status, age distribution, marital status, remuneration, work week and work year, and data on retired hygienists. The greater part of this section consists of information never before available.

B. Duane Moen

A GUIDE TO GRADUATE STUDY

Edited by Frederic W. Ness. 335 pages. Index. $5. Association of American Colleges, Harrisburg, Pa., Evangelical Press, 1957.

The Association of American Colleges' newly published reference book of graduate program offerings will be welcomed by educators and students throughout the nation's educational system. For the 1956-7 school year, 135 colleges and universities have described graduate study programs in the liberal arts and science fields, to include such essential data as: admission requirements, fees and first-year aid programs, prerequisites, residence requirements, and graduate-school faculty and enrollment figures. The schools are listed alphabetically for easy reference use and for the first time it is possible to compare current program offerings of many schools presenting similar graduate degree programs.

Dentists and dental students, together with dental educators, will accept this book as a useful reference guide in planning graduate studies for dental teaching and research careers. In a single volume, plans for graduate studies in dentistry or the basic science fields can be initiated and important decisions, heretofore requiring voluminous correspondence and ponderous time intervals, can be reached.

In addition to its value as a reference book, *A Guide to Graduate Study* contains some very thoughtful comments on the objectives of graduate study, and on selecting the graduate school, financing graduate school education, and other topics of interest to individuals contemplating advance study programs, and to

faculty advisers from the high school level and up.

The Association of American Colleges has published this book as a recruitment manual and it is frankly offered as a major effort to promote a wider interest in the teaching profession. By offering a "Guide to Fields of Study for the Ph.D." in the closing 12 pages of the book, this purpose may very well be served for here, succinctly and in alphabetical arrangement of fields of study, is a listing of the schools which have programs in the same study areas. This kind of "Main Street Shopping Center" for Ph.D. programs—an open, comparative study—will not only promote the interest of students in continuing an education beyond the baccalaureate degree but also draw the keen blade of competition across the schools themselves.

Ben F. Miller III

THE CARBOHYDRATES—CHEMISTRY, BIOCHEMISTRY, PHYSIOLOGY

By Ward Pigman. 919 pages. Index. $20. New York, Academic Press, 1957.

This is a text and reference work designed for research investigators, teachers and advanced students. Most of its 21 contributing authors are chemists. Its binding, printing and other mechanical features are excellent, and it is well edited and the illustrations are adequate.

There is a 35 page chapter on carbohydrates in nutrition which would interest a dental reader. Eight pages of this chapter are on the dental aspects.

Because it is valuable for reference purposes, this book should be in the libraries of all dental schools and all establishments where dental research is conducted. It is too highly specialized to appeal to most practitioners of the health professions.

Donald A. Wallace

A MANUAL OF ORTHODONTICS

By Hallam Gresham, D.D.S. (N.Z.) 196 pages. Index. Christchurch, New Zealand, N. M. Peryer Limited, 1957.

In a small book for handy reference the author gives an outline of the fundamentals of orthodontics, particularly for undergraduate students and those general practitioners who may wish to use removable appliances in the treatment of malocclusion. Only removable appliance methods of treatment are described, and since proficiency in fixed appliance therapy is a prerequisite for specialization, this demands postgraduate study which is beyond the scope of this book.

The six chapters include such subjects as growth and development, etiology, diagnosis and treatment.

William F. Ford

ESSENTIALS OF HUMAN ANATOMY

By Russell T. Woodburne, A.M., Ph. D. 620 pages with 403 illustrations. Index. $12.50. New York, Oxford University Press, 1957.

To quote from its preface, "This text presents the basic contents of the systems of the body and then examines the body in detail, regionally. Within each region, the order of presentation is from superficial to deep—the only order in which the body can conveniently be dissected." The objective here stated has been realized in most respects—interesting style, excellent black and white drawings adequately located, large type on a good quality two-column page and, most important, the telling of an attractive and stimulating story.

The traditionalist will deplore the absence of separate pictures and descriptions for each bone of the skull, whereas the bibliophile will miss a separate list of illustrations. A fine feature of the index is the separation of text and figure citations.

The book cannot fail to help any beginner to learn more anatomy with less wasted time.

John A. Cameron

THE DENTITION OF THE AUSTRALOPITHECINAE

By John T. Robinson. Transvaal Museum Memoir No. 9. 179 pages with 50 illustrations. Pretoria, South Africa, Transvaal Museum, 1956.

The similarity of the Australopithecine teeth to those of modern man is strikingly demonstrated in Robinson's well written and beautifully illustrated book on the fossil finds of South Africa. Four hundred and forty-eight permanent and 78 deciduous teeth were available for the dentition study of these peoples who lived some million years ago.

The Australopithecinae are considered to be very close to the main line of evolution in man's descent. Their specializations as well as primitive traits are occasionally seen in present day dentitions. Robinson's use of modern dental research tools give the work an up-to-date air. He discusses the teeth one by one

with keen, deliberate analysis of the wherefore and why of form and function.

Three general groupings of the dentitions are proposed. Paranthropus, one of the genera outlined, is represented as probably being a vegetarian with massive posterior teeth and generally smaller anteriors. "The vegetarian diet," Robinson states, "did not require large canines and obviously the freed hands [and greater intelligence?] must have taken over the functions of the canines in defense and the maintenance of dominance in the social organization, because the canines are remarkably reduced in size." The Australopithecus (the second grouping) was probably a more or less omnivorous feeder, having larger incisors and smaller posterior teeth. Telanthropus, the third group, was more like the modern forms, although found along with the others in the hard breccia layers.

This book can be recommended readily as good, easy and authoritative reading for those individuals who would like to gain a historical perspective of dentitions in the evolutionary vein. These dentitions represent the notorious "missing link" of a generation ago.

Albert A. Dahlberg

DENTAL CLINICS OF NORTH AMERICA—QUARTERLY—JULY, 1957 ISSUE. EMERGENCIES IN DENTAL PRACTICE

By James R. Cameron, D.D.S., Sc.D., in collaboration with 26 co-authors. 284 pages with illustrations. Index. $15 yearly subscription. Philadelphia, W. B. Saunders Co., 1957.

It is unfortunate that so many practitioners have had extremely limited training in the management of emergencies, and are apt to be incompetent in coping with such situations. The practicing dentist should be familiar with all facets of conditions that may arise in daily practice, and must at least be competent in the handling of emergencies which may occur in his office. The purpose of this book is to prepare the practitioner accordingly.

The need for an up-to-date, compact, authoritative and comprehensive compilation of management of emergencies was the basic motive for preparing this volume. The text, which is in the form of a symposium, contains 23 chapters. It covers the fundamentals in the treatment of the more common types of emergencies that may occur. The dentist dealing with an emergency must gather evidence quickly and make a wise decision. This volume should prove most helpful in this regard. The authors are well qualified in their specialties. Description of procedures conforms to accepted standards. The material is presented in a lucid, concise and readable manner. Bibliographies are provided at the end of several chapters.

Students and practitioners who want a worthwhile reference for emergencies in dental practice will find this book useful and interesting.

E. Alan Lieban

CORTISONE IN DENTISTRY

By Lyon P. Strean, Ph.D., D.D.S. 178 pages with 57 tables and illustrations. Index. $5.95. Brooklyn, Dental Items of Interest Publishing Co., 1957.

Despite the title, hydrocortisone is the drug most discussed in this book. Cortisone, corticotrophin and other related substances are also covered. The newer corticoids, fludrocortisone and prednisolone, are referred to only briefly.

The physiology of the adrenal cortex and the pharmacology of cortisone, hydrocortisone and corticotrophin are discussed in the first two chapters. The next three chapters deal with possible clinical applications of these substances in dentistry. Hormonal treatment of arthritic temporomandibular joints is stressed in this section. Systemic diseases of oral significance, maintenance therapy and the relationship of adrenocortical steroids to various oral abnormalities are the topics for the remaining chapters.

There are many illustrations, but unfortunately a number of them are reproduced poorly. There are nearly 300 items in the bibliography and 42 dental references in an appendix. The language used is simple and understandable; the interest of the reader is well sustained. The paper and printing generally are good.

Dentists should understand the theoretical and practical fundamentals of adrenocortical steroid therapy, if only because many of their patients are receiving these drugs upon instructions from their physicians. This book may help its dental readers to know more about the actions of cortisone and related substances.

However, the impression is given repeatedly in this book that the adrenocortical steroids, particularly hydrocortisone, have broad and frequent legitimate therapeutic applications in dentistry. This impression is misleading, since the established uses for hydrocortisone in dentistry are very few.

Furthermore, the hazards associated with the use of any of these drugs, which suppress the symptoms of infection while permitting

the infection itself to progress, are obvious. Such hazards should be given special consideration in the oral area, where contaminating microorganisms and attractive incubation zones always are present. This point is not sufficiently emphasized in the book.

Since *Cortisone in Dentistry* is apparently without significant competition in its special and important field, it deserves attention. If it is read critically and carefully, much can be learned from it.

Donald A. Wallace

NATIONAL VOLUNTARY HEALTH ASSOCIATION IN CANADA (ADDRESSES DELIVERED AT THE 36TH ANNUAL MEETING OF THE HEALTH LEAGUE OF CANADA, MARCH, 1956)

80 pages. Index. Toronto, Health League of Canada, 1957.

The Health League of Canada is a coordinating organization representing 16 voluntary specialized health organizations. These organizations cover most of the prevalent diseases.

In addition to its function as a coordinator, another major activity of the League is to reverse the present trend from medical care to the prevention of disease.

The report includes a description of the activities of each of these specialized health organizations as well as their methods of financing.

Within the report of the Maternal and Child Health group is a short section devoted to fluoridation of water supplies for the partial prevention of dental caries. This report only contains a restatement of the accepted methods and technics of water fluoridation; there is no report of activities and accomplishments to date.

This booklet will provide considerable information for those interested in the activities of voluntary health organizations in Canada.

F. C. Cady

THE FUNCTIONS AND EDUCATION OF MEDICAL RECORD PERSONNEL

By Antonio Ciocco; Olive G. Johnson, Dorothy Knoell and Bertha Pfenninger. Index. Appendix. $2. Pittsburgh, University of Pittsburg Press, 1957.

This survey report to the American Association of Medical Record Librarians explains the functions of medical record personnel, especially the medical record librarian. The viewpoints on the functions of the medical record personnel in various hospitals which differ in size and type are given by the hospital administrators, physicians, hospital department heads and active medical record librarians.

There is a tabular summary of the functions of medical records, as well as the medical record technician, with reference to: assisting the medical staff; development, analysis and technical evaluation of clinical records; development of secondary records; development of statistics; organization of departmental records; preservation of records; education, information and training, and management of medical record department.

Present methods of educating medical record personnel are discussed in the second part of the survey. What appears to be a fine curriculum for students working for a baccalaureate degree in the field is developed.

The index of this book serves as a valuable reference tool for medical record librarians and hospital administrators.

Minnie Orfanos

GENERAL TECHNIQUES OF HYPNOTISM

By André M. Weitzenhoffer, Ph.D. 460 pages with 24 illustrations. Index. $11.50. New York, Grune & Stratton, Inc., 1957.

This book should well fulfill its author's intended purpose—a source book "for teaching introductory and advanced courses in hypnotism at the graduate level." The contents deal almost exclusively with exercises and demonstrations which provide the reader with a comprehensive coverage of general hypnotic technics.

Although the text presupposes a high level of professional training on the part of the reader, no such assumption is made in regard to his background in hypnosis. An adequate preface with a guide to reading of the various chapters enables the novice or the advanced student of hypnosis to adapt the material to his own individual needs.

Step-by-step procedures for a greater number of basic hypnotic induction technics are outlined and numerous variations are presented. Consideration is given to advanced technics and specialized problems of hypnosis, and sufficient background in the dynamics and historical aspects of hypnosis is integrated with, but does not obscure, the primary purpose of the book.

Those portions of the text devoted to waking suggestion and autosuggestion are worthy of special mention, as are the bibliography and lists of selected readings.

W. O. Ramsey

CHRONIC ILLNESS IN THE UNITED STATES, VOLUME IV. CHRONIC ILLNESS IN A LARGE CITY—THE BALTIMORE STUDY

By the Commission on Chronic Illness. 620 pages. Index. $8. Cambridge, Mass., Harvard University Press, 1957.

The fourth volume in this series prepared by the Commission on Chronic Illness describes in detail the observations made in an exhaustive study of chronic illness among a representative sample of the noninstitutional population of Baltimore, Md.

The study included household interviews and clinical examinations. The prevalence of selected diseases is enumerated and related to such factors as age, sex, color, economic level and other significant variables. The household interviews were supplemented with clinical evaluations, studied estimates of the needs for care, and inquiries into peoples' attitudes toward illness and care.

The report is well organized, clearly written in summary fashion and supported with voluminous tables, graphs and exhibits to add ample detail. The chapter on prevailing dental conditions assembles important data on this subject with special information undoubtedly not contained in any other survey.

The book will provide invaluable source material to social and health agencies concerned with organizing preventive and health care programs, particularly in the vast area of chronic illness.

W. Philip Phair

FORTSCHRITTE DER KIEFER- UND GESICHTS-CHIRURGIE: EIN JAHRBUCH, VOLUME III (PROGRESS IN MAXILLOFACIAL SURGERY: A YEARBOOK, VOLUME III)

Edited by Karl Schuchardt. 359 pages with 391 illustrations. DM.96. Stuttgart, Georg Thieme, 1957.

This volume contains a selection of lectures delivered at the sixth conference of the German Society for Maxillofacial Surgery which was held in Hamburg in 1956. This conference showed an international character in research, surgical technics and postoperative treatment, demonstrated by oral surgeons, plastic surgeons, neurosurgeons, dermatologists, roentgenologists, otorhinolaryngologists and cancer specialists from Austria, England, France, Hungary, Italy, Spain, Sweden, Switzerland and Germany. About 50 lecturers covered the field of malignant tumors in the maxillofacial region, each of them providing a chapter dealing with one of the many pathologic conditions, treatment planning, surgical interventions, diagnosis and prognosis.

Generally the discussions are enlightening and are written with a simplicity and clarity of style which, unfortunately, is seldom encountered in German scientific works. In isolated instances, however, the authors' comments seem to be more appropriate for dental or medical students than for experienced clinicians and practitioners.

The authors have avoided hypothetical discussions of the many controversies existing in the field of cancer diagnosis and therapy. They have performed an outstanding service for present-day dentistry and medicine in reporting the different surgical methods used in Europe to combat malignant tumors in the maxillofacial region and in advocating appropriate procedures to obtain cancer control.

Adequate summaries in English accompany all chapters. Although the addition of index, biography and bibliography would have increased the value of this yearbook for American readers, this work, excellently illustrated, printed and bound, will undoubtedly be as well received as the two previously published issues which dealt with orthodontics and fractures of the jaws.

Paul H. Glucksman

DIE INTERDENTALEN RANDVERHÄLTNISSE BEI AMALGAMFÜLLUNGEN (INTERDENTAL MARGINAL CONDITIONS AFTER INSERTION OF AMALGAM FILLINGS)

By Walter Wildisen, 28 pages with 6 illustrations. Swiss francs 3.50. Basel, Benno Schwabe & Co. Verlag, 1957.

This is the eighth issue of the series *Odontologica: contributions to the entire field of dentistry*, edited by Prof. Oscar Müller of the Dental Institute of the University of Basel, Switzerland.

The biochemical, physiologic and histologic findings of various investigators into the reasons for success or failure of amalgam fillings are based on studies carried out in several Swiss dental clinics. In easily understandable tables, diagrams and serial roentgenograms, the results of these investigations are described and evaluated.

This stimulating report, in which reference is made to American and European authors, emphasizes the importance of indication and contraindication of amalgam restorations in individual instances. Although some of the restorative technics described may appear strange to American readers, the significant points raised and the high quality of the illus-

trative material presented will make this booklet a useful addition to the library of dental practitioners who are able to read and understand its rather complicated scientific German. Although there is no index, American readers will find this monograph with its well selected and carefully prepared bibliography highly useful and instructive.

John P. Herrick

THE REHABILITATION OF SPEECH

By Robert West, Merle Ansberry, and Anna Carr. Third edition. 688 pages. Index. Appendix. $7.50. New York, Harper & Brothers, 1957.

The scope and general character of this work are somewhat the same as in previous editions. However, since the first edition appeared in 1937, the field of speech correction has changed and the present edition of the text has been modernized accordingly. Knowledge, ideas and principles of speech pathology have advanced so within the past 20 years that much material in the original text had to be left out to permit the authors to include material they felt was more important and timely.

The work is divided into two parts: Book 1, "The Pathology of Speech and the Rationale of its Rehabilitation," and Book 2, "Remedial Principles." The former, by West, presents: (1) the neurophysiological mechanism for speech production, (2) discussion of normal speech in contrast to abnormal, (3) chapters on special classifications, such as dysphonia, dysarthria, aphasia, deafness, stuttering, secondary disorders of speech, and mongolism, and (4) case study and evaluation. The latter, by Ansberry and Carr presents: (1) the bases of rehabilitative procedures with details concerning organization of a program and qualifications of a speech therapist, and (2) remedial principles helpful in treatment.

There has been a change in the co-authors of the text from the first and second editions. The new co-author is responsible for the selection and preparation of very clear and unusual photographs of the articulatory positions which should be of great interest to the dental profession.

These photographs and accompanying explanations are unique and certainly will clarify for many dentists their ideas as to just where the tongue is in relationship to the teeth and the alveolar ridges when the patient is producing certain sounds.

This book deals less with therapy and more with etiology and diagnosis than many speech texts. Also it contains many more medical terms which should make it easier reading for the average dentist.

The authors' approach to stuttering is a bit different in this edition than in the former one. Attempts to distinguish between the basic condition and the outward manifestation or speech symptom are made. Characteristics of the stuttering syndrome are presented in order to differentiate stuttering from similar disorders and from nonpathological interruptions.

There is a section on hearing and hearing aids. The appendixes contain the code of ethics of the American Speech and Hearing Association and information about the clinical certification requirements for speech therapists. Any dentist who has wondered what training is required for a qualified speech therapist will find the answer here.

Little has been subtracted from the glossary since the first edition and a few new entries have been made. Some definitions have been reworded and modernized.

After reading the sections on "Speech Defects Associated with Oral Deformities" dentists may have a new idea as to the important role dentistry plays in the rehabilitation of individuals with certain speech defects.

This is a forceful book by a man who has a fine professional background and who was one of the early scientific workers in the field of speech rehabilitation, and he has the cooperation of very capable co-authors.

It could be stated that to the dental reader the photographs of the articulatory positions alone would be worth the cost of the book.

Howard E. Kessler

INTRODUCTION TO ANESTHESIA: THE PRINCIPLES OF SAFE PRACTICE

By Robert D. Dripps, M.D., James E. Eckenoff, M.D., and Leroy D. Vandam, M.D. 266 pages with 47 illustrations. Index. $4.75. Philadelphia, W. B. Saunders Co., 1957.

As the authors state in the preface, this book is an extension of a smaller work printed and circulated in the department of anesthesiology of the hospital of the University of Pennsylvania. Thus it is primarily designed for the junior resident in anesthesia who must acquire basic knowledge before graduating to the many larger textbooks and monographs which he is expected to study in the course of his training. For this purpose the book is excellent even if similar works are already available. Other readers interested in the subject also will gain much from this book, but probably will want to omit a few chapters which

do not concern the professional anesthesiologist.

The book is laid out efficiently in five sections and 34 chapters. This, together with a very adequate index, makes reference to any particular topic easy. The style of the book is clear. Headings are used freely, and therefore the text can be followed easily. Illustrations and line drawings are of good quality. The book is printed on first class paper, and is bound sturdily and attractively.

The book can be recommended highly to all beginners in anesthesia who wish to lay a foundation for further knowledge.

Gordon M. Wyant

SURGERY OF HEAD AND NECK TUMORS

By Hayes Martin, M.D. 430 pages with 599 illustrations. Index. Appendixes. $18.50. New York, Paul B. Hoeber, Inc., 1957.

Twenty-three chapters with easily understood, diagrammatic sketches show the steps to be followed in the many surgical procedures advocated by the author, when dealing with tumors of the head and neck.

Chapter 1 is devoted to interesting, historical notes covering surgical procedures of early surgeons. Preoperative considerations outlined in Chapter 2 are presented in an excellent manner and are well worth careful rereading by surgeons interested in treating cancer of the head and neck.

The material covered in the remaining chapters clearly outlines basic principles to be followed if eradication of malignant disease is to be accomplished. The author leans strongly to early radical operations due, undoubtedly, to his extensive experience in observing continuation of the disease after incomplete surgery. This reviewer, however, questions the need of dividing the lip to gain access to well localized tumors of the oral cavity which can be approached and excised completely by an intraoral operation.

The outline of plastic procedures with the aid of antibiotics, and, at times, the use of oral prosthesis, is explained carefully. Credit to the advancement of anesthesia rightfully is given as it has opened the door for extensive and safe surgical procedures about the head and neck.

An appendix outlines the instruments recommended for head and neck operations and is a valuable contribution to the text.

The book is recommended highly as a guide to general surgeons, plastic surgeons and oral surgeons who encounter malignancy of the head and neck in their daily practice.

James R. Cameron

DIE INKORPORIERTE MEHRGLIEDRIGE PROTHESE: DIE SOGENANNTE FESTSITZENDE BRÜCKE (INCORPORATED MULTIPLE PROSTHESES: THE SO-CALLED FIXED BRIDGES)

By Arturo Hruska, Giovanni Hruska and Kurt Hruska. Translated from Italian into German by D. Maschinski. Introduction by Karl Häupl. 228 pages with 100 illustrations. Index. DM. 28. Munich, Carl Hanser Verlag, 1956.

The rather unusual title of this book is based on the rejection of the term "bridge" as it is used in dental literature to designate a partial denture supported and kept in position by abutment teeth. This opinion by the authors seems to be shared by many European (mainly German and Italian) dental educators, researchers and authors. Many other terms, which have been used in international dental literature for many years, also are rejected and more or less adequately replaced. The authors emphasize the need for an international dental nomenclature, a need which also has been expressed by many American authors interested in the subject.

Although this book has been prepared by three outstanding Italian experts in the field of prosthodontics, it gives the appearance of having been written by one author only because none of the individual chapters are signed.

In spite of the many reservations the reader may have regarding the new terms suggested by the authors, this book definitely is a useful work, as it is based on extensive experience in dental prosthetics and education. It presents new ideas on the universal problem of formulating terms which can be understood by dentists all over the world. It is well written and translated, excellently illustrated, printed and bound, and covers all the essentials of bridge ("incorporated connecting multiple prosthesis") construction.

It should be studied with critical eyes by dental practitioners, prosthodontists and all others who are interested in European prosthetics and international dental nomenclature.

John P. Herrick

Current Literature

CONSIDERATIONS IN TREATMENT OF OCCLUSION

Ruth Moulton. J. Pros. Den. 7:148 March 1957.

In the analysis and treatment of occlusal and temporomandibular joint dysfunction, the psychosomatic aspect cannot be ignored. In a study of 35 patients afflicted with temporomandibular joint pain, those for whom the dental and medical examinations did not reveal the causative factor were referred for psychiatric consultation. Chronic bruxism was found to be commonly associated with the pain and spasm. It became more pronounced just before the onset of acute symptoms.

Many patients associated the onset of their symptoms with a traumatic dental experience. The dental experience may have been superimposed on an already overloaded nervous system and could not be tolerated by the patient.

The pain pattern in an emotionally upset individual differs from that which results from specific neurologic or structural lesions. It tends to be diffuse and to follow the nervous pathways. It is often associated with other symptoms of anxiety, particularly with gastrointestinal complaints.

Of the 35 patients studied, four were considered to be relatively healthy persons. The other 31 were anxious and tense. Eleven were psychotic or prepsychotic, and in ten, there was considerable depression.

The dentist must modify his dental approach for anxious patients. Some understanding of the tensional factors is necessary. The speed and extent of treatment must be modified to conform with the patient's ability to accept the treatment. If the tension factors are beyond the scope of the dentist's psychological therapy, the patient should be referred for psychiatric examination.

John R. Thompson

THE PROTECTION OF EXTRACTION WOUNDS

J. C. Thomson. D. Practitioner & D. Record, 7:251 May 1957.

The purpose of this study was to observe the postoperative course of patients for the first few days after extractions. It was noticed that patients who had immediate dentures had less pain than those whose sockets were left unprotected. Efficient healing of the socket depends on the formation and maintenance of a healthy blood clot. The ultimate goal of the healing process should be the formation of a sound bony ridge, adequate to support an efficient prosthesis. Much of the blood clot frequently disintegrates when the socket is left unprotected. Wounds healing under immediate dentures result in a sound bony ridge, which is due largely to the protection afforded by the baseplate.

The design of the baseplate is of prime importance to the success of the denture in function and as a wound dressing in influencing the shape of the residual alveolar ridge. Design of appliances is within the province of the dentist, and to control the design of the baseplate of an immediate denture the dentist himself must carve the master model prior to the technician setting up artificial teeth. Compression of marginal mucosa by the denture and displacement of blood within the sockets by unduly deep "socketing" of artificial teeth should be avoided. Immediate denture service is, from many points of view, the most efficient method of prosthesis.

A STUDY OF FOOD HABITS OF 4,425 TORONTO SCHOOL CHILDREN

Janet Wardlaw, Ethel Beamish and Corrine Trerice. J. Canad. D.A. 23:344 June 1957.

Adequacy of diets is judged either by comparing the intake of essential food groups with an accepted standard or by determining the intake of nutrients. In recent years, this subject has received much attention.

The Toronto Nutrition Committee undertook a one day food intake study to: (1) determine eating habits of eighth grade Toronto children, (2) determine adequacy in terms of intake of essential food groups, and (3) arouse interest, by using the results, in those concerned with the welfare of children.

On Feb. 1, 1956, the survey was carried out on 4,425 eighth grade pupils. No special educational talks on food were given by the teachers. A detailed outline of scoring was prepared, and each child was instructed to record his food intake, indicating the size of the serving. (An unsatisfactory daily intake of foods was computed and listed.)

Scoring was done by trained adults, and results were expressed as percentages of pupils having unsatisfactory intakes of the food

groups studied. Although deviations from the mean were noted, a typical pattern was apparent throughout the city. The amount of milk, citrus fruits, vegetables, meats, cereals, and Vitamin D were considered. Only meat appeared to be used to a satisfactory extent, and vitamin D was lacking markedly.

INLAY PRODUCTION FROM RUBBER-BASED MATERIALS

A. Kinghorn and D. N. Allan. Brit. D. J. 103:1 July 2, 1957.

Inlays can be fabricated by using rubber-based impression materials that are as accurate as those produced by hydrocolloid. The rubber-based material is injected into the cavities by a syringe made from the normal anesthetic carpule and syringe. The dies are prepared from stone and are so placed in the impression by means of a jig that they may be separated and replaced accurately in the model. The inlays are then waxed, cast trimmed and polished. Much chair time is saved by this method.

Emmett M. Stanton

A PILOT CLINICAL INVESTIGATION INTO THE VALUE OF GRAMICIDIN IN THE TREATMENT OF VINCENT'S ULCERATIVE GINGIVITIS

J. Driver. D. Practitioner 7:299 June 1957.

A clinical investigation was conducted to determine the value of Gromidin tablets in the treatment of acute ulcerative gingivitis (Vincent's). The Gromidin tablet consists of 0.25 mg. of gramicidin, sucrose, lactose, acacia, magnesium stearate, oleum menthae piperitae, with a coating of sucrose, blue dye, and a polishing wax.

A pilot clinical investigation was started with ten patients that had been clinically diagnosed as having ulcerative gingivitis of the Vincent's type. The patients were divided into two groups of five each. One group was treated by prescribing 24 Gromidin tablets for each patient with instructions to take one at half-hourly intervals, by allowing the tablets to dissolve under the tongue. The other group was treated with 5 per cent chromic acid and 10 per cent hydrogen peroxide applied locally to the ulcerated areas after which the Gromidin tablets were prescribed with the same instructions as the first group.

A completely satisfactory result was obtained in only one instance in which it was thought that the condition which had been acute was entering a chronic phase. Satisfactory results were obtained in all instances only after scaling and polishing of the teeth and instructions given in oral hygiene.

The results from this pilot study indicated that a full clinical investigation was not justified since gramicidin was not effective in the treatment of acute ulcerative gingivitis of the Vincent's type.

TAX DEDUCTIBILITY ON REGISTERED RETIREMENT PLANS

J. T. Staddon. J. Canad. D.A. 23:347 June 1957.

Necessary legislation was enacted in Canada on April 12, 1957, to permit premiums paid toward specified retirement savings plans to be deductible for taxation purposes. This law was made retroactive to Jan. 1, 1957.

Briefly, premiums paid to Registered Savings Plans may be deducted up to a limit of the lesser of 10 per cent of earned income, or $2,500, each year. This is the primary advantage of the law, and it is of great help to those who provide for retirement entirely from their earnings.

A plan must conform to certain requirements: (1) there can be no loan values, (2) there can be no cash surrender values (subject to modification), (3) contract cannot be assigned, and (4) ultimate proceeds of the contract must be used to buy a level annuity for the life of the participant.

Certain specific supplementary benefits may be added to the plan, but the portions of the premium for them are not deductible. The pension, when drawn, will be taxable as earned income.

These concessions in the law offer a considerable inducement to invest up to 10 per cent of earned money in a Registered Savings Plan.

PRECISION-FORMED POLYETHYLENE IMPLANTS FOR CORRECTION OF MANDIBULAR CONTOUR

Burke B. Shevick. J. Southern California D. A. 25:34 Jan. 1957.

Precision polyethylene implants, to correct mandibular contour, were used successfully in 20 patients who suffered from microgenia and micrognathia. The implants not only restored normal contour but also increased support of the soft tissues that had been advanced over the mandible. This enabled the lips to meet

more easily and resulted in an improvement in speech and reduction in mouth breathing.

In the past, mandibular contour deformities corrected by onlay grafts of cartilage on bone resulted in serious deficiencies. Preserved cartilage fails to become fully immobilized and often is absorbed. Autogenous cartilage tends to curl after it is transplanted. Autogenous bone also undergoes absorption when it fails to serve a physiologic need.

Polyethylene can be shaped to any desired form and meets the essential requirements of a synthetic material used for implants. It is noncarcinogenic.

In constructing a mandibular polyethylene implant the mandible is exposed intraorally to its inferior border. A compound impression is made of the exposed mandible, and the mucosa is returned to place and sutured. A cast is made, upon which a wax model is shaped of the desired form of the implant.

The wax model is molded in polyethylene by either the compression or injection method. After a delay of one month to permit firm healing of the gingiva, the implant is inserted extraorally through a submandibular incision.

Precision polyethylene implants seat firmly and resist displacement. Detection by palpation is difficult.

A. H. Grunewald

PROSTHETIC REHABILITATION OF A CLEFT PALATE PATIENT SUBSEQUENT TO MULTIPLE SURGICAL AND PROSTHETIC FAILURES

Ralph S. Lloyd, Samuel Pruzansky and J. Daniel Subtelny. J. Pros. Den. 7:216 March 1957.

Both surgical and prosthetic treatment had failed to produce adequate cosmetic and functional improvement for a patient. Two separate problems barred the attainment of intelligible and pleasant speech. First, there was the quality of hypernasality caused by the inadequacy of the mechanism, which produced a separation between the oral and nasal portions of the pharynx. Second, the articulatory faults in the patient's speech seemed related to the faulty occlusion, the missing dental units, the abnormal palatal vault and the inharmonious relationship between the upper and lower lips.

Lateral cephalometric films obtained during the sustained phonation of the vowel "u" confirmed the inadequate extensions of the original appliance and the necessity for the design of a new one. The primary objectives of the new appliance were (1) to provide an adequate pharyngeal section for good nasopharyngeal valving, (2) to provide good occlusal relationships and a more normal contour to the palate, (3) to reduce the vertical freeway space and to increase the vertical dimension of the face and (4) to provide for a more harmonious relationship between the upper and lower lips.

Cephalometric and laminagraphic studies provided an important adjunct for an accurate comparison between the old and new speech appliances. Compared with that of the original appliance, the new pharyngeal section was totally different in size, shape, and location within the pharynx. Also, with the new speech appliance in place it was apparent that the vertical dimension of the denture area had been considerably increased.

In view of the improved architectural situation and the increased motivation on the part of the patient, it is anticipated that the prognosis for continued improvement in terms of speech is excellent at the present time.

M. S. Rosen

SOME PSYCHIATRIC ASPECTS OF DENTAL SURGERY

E. Stengel. Brit. D. J. 103:10 July 2, 1957.

There are areas of common interest in psychiatry and dentistry. Psychosomatic dentistry is concerned with the relationship of the health of oral tissues and mental well-being. Nine clinical studies were conducted in which psychiatric symptoms were observed after dental extraction. In five of these patients, previous mental illness was noted. Psychological preparation of the patients predisposed to mental illness is indicated as a means of reducing neuroses.

Emmett M. Stanton

DENTAL SURGERY AND THE DIABETIC PATIENT

Henry Mandiwall. D. Practitioner 7:255 May 1957.

Surveys of the population indicate that in every three hundred patients one is known to have diabetes. There is a family history of diabetes in one quarter of all patients, and obesity is a potent precipitating factor. The commonest symptoms are polyuria, polydipsia, fatigue and loss of weight. Together with these, infections may be present such as carbuncles, boils and styes.

Dental infections will, like infections in organs in other parts of the body, make the diabetic state worse and may produce manifest

symptoms in a patient in whom the disease previously may have been latent.

The diabetic may become comatose either by the disease getting out of control or from an overdose of insulin. For the former condition insulin is given—for the latter—sugar by mouth or by vein.

Where any oral surgery (on a diabetic patient) is to be performed it should be carried out under the joint supervision of a dental surgeon and a physician in a hospital. The management of diabetes is much easier when local anesthesia rather than general anesthesia is used. However, the local anesthetic solution should not have an Adrenalin content of more than 1 in 75,000. Postoperative complication will be minimized if vitamins B and C are given, together with antibiotics.

Warren R. Schram

PREMATURE LOSS OF DECIDUOUS TEETH

B. R. Townend. Brit. D. J. 103:6 July 2, 1957.

The study of biology indicates that genetic influences play the major role in conditioning the development and final pattern of the dentition. Two factors are necessary for a normal dentition. These are the proper synchronization of the growth and development of the teeth and the growth and development of the jaws. If there is an imbalance between these two factors, malocclusion will develop. It is not therefore the premature loss of the deciduous teeth that is the basic cause of malocclusion. The premature loss of deciduous teeth may, however, alter the characteristics of an incipient malocclusion.

Emmett M. Stanton

SURGICAL PREPARATION OF THE MOUTH FOR A PROSTHESIS

S. Elmer Bear. J. Oral Surg. 16:3 Jan. 1958.

There are numerous conditions existent within the oral cavity which present problems for the prosthodontist in the construction of a prosthesis. Since the advent of the antibiotics, which reduce some of the hazards of elective oral surgery, much can be done to produce a normal foundation on which to place a denture. With the ever increasing number of geriatric patients, the preparation and maintenance of the supporting oral structures is most important. Age, alone, is no barrier to oral surgery as the well preserved elderly patient can tolerate surgery most satisfactorily.

When the oral cavity is evaluated preparatory to the construction of a partial or complete prosthesis, specific attention should be directed to the following conditions: (1) soft tissue masses in the form of traumatic hyperplasias; (2) redundancy of soft tissue in the alveolar crest; (3) enlarged tuberosities producing undercuts and loss of inter arch space; (4) irregular alveolar ridges; (5) bony protuberances in the form of tori or exostoses; (6) sharp and tender alveolar ridges; (7) a sharp and poorly positioned mylohyoid line; (8) an abnormal ridge relationship of the maxilla to the mandible; (9) scars in a position to prevent normal seating of a prosthesis; (10) muscle fibers or frenums whose attachment prevent proper flange extension in a prosthesis; (11) loss of labial, buccal or lingual sulci due to atrophy of the alveolar ridge, and (12) any pathologic condition of the tongue, palate or cheek and associated structures. This must be properly evaluated.

The cooperation between the general practitioner and oral surgeon is most important in correcting the abnormalities enumerated. It is necessary in many of the procedures described to utilize a prosthetic appliance as a means of retaining the soft tissue flaps. Without the appliance, the success of the surgical procedure is questionable.

Numerous procedures have been devised to restore the vertical height of the alveolar ridges, but the opportunity to use that portion which remains should not be ignored. The number of people who need surgical intervention for the correction of abnormalities is increasing and every effort should be exerted to aid them in the retention of a prosthetic appliance.

CONTINUOUS INTRAVENOUS SEDATION: ITS APPLICABILITY IN THE DENTAL OFFICE

Morton J. Olin. J. Oral Surg. 15:286 Oct. 1957.

An intravenous agent was used in combination with local anesthesia for carrying out oral surgical procedures in the office. The method, properly carried out, is both safe and pleasant.

With the intravenous agent, the patient is held at a level similar to that used by psychiatrists, where the patient is awake but not fully conscious.

During surgery, the patient is maintained in a well sedated, amnesic plane. The amount of drug given is varied according to the particular needs of the moment. The patient need never be unconscious.

This method is applicable for those patients who are extremely fearful of injections of local anesthetics or of being unconscious,

or of the surgery itself. It has certain advantages over general anesthesia in that the patient, not being unconscious, still has his protective reflexes, and is therefore less susceptible to many of the dangers of a general anesthetic. The surgeon is able to operate at his own rate of speed without any special need of hurrying.

With intravenous sedation, the respiratory exchange is not significantly altered. The incidence of laryngospasm is greatly decreased, and, if it should occur, can be readily corrected. Nausea and vomiting are practically nonexistent. Recovery time is virtually immediate.

As with any other method of anesthesia, premedication may be given preceding intravenous sedation when indicated. The preoperative and postoperative instructions are the same as they would be for general anesthesia. The patient must be instructed not to have any food or drink for several hours before his appointment, and he should be accompanied by someone who can see him safely home.

It should be emphasized that this method is not applicable unless the operator is familiar with the use of general anesthesia and is prepared to treat any anesthetic emergencies.

FULL PORCELAIN VENEER CROWNS

John C. Bartels. J. Pros. Den. 7:533 July 1957.

One of the basic causes of full porcelain veneer crown fractures is excessive tooth reduction. Porcelain is a friable material when subjected to heavy stress. For this reason, support within the porcelain veneer crown is imperative. This can be accomplished by conservative tooth preparation or, when necessary, by rebuilding basic tooth structure with platinum pins and alloy cement bases or gold castings.

The life expectancy of full porcelain veneer crowns can be increased by equalizing the stress over a maximum portion of the dentition. With the present emphasis on balanced occlusion, it should be expected that less destructive stress will be exerted on the anterior teeth. This factor should be a routine part of the diagnosis and treatment planning prior to tooth preparation.

Preparation of anterior teeth should conform to the requirements of the particular instance instead of following a stereoscopic picture design.

The following rules are useful in tooth preparation:

1. Maximum length at the labial incisal edge should be maintained.
2. The labial shoulder can be eliminated and a chamfer preparation should be used. (In the case of very convex labial surfaces, it is no more than a finishing line.)
3. Excessive subgingival extension should be avoided.
4. One-half millimeter width for the interproximal and lingual shoulder is adequate.
5. Excluding the incisal portion, 1 millimeter thickness of porcelain is maximum for the veneer crown.
6. One and one-half millimeters thickness of porcelain is maximum for the incisal area.

The labial chamfer is prepared with an end cutting inverted cone diamond stone with a smooth periphery. The smooth edge prevents gingival laceration. The face of the instrument should be approximately a quarter of an inch in diameter. This type of preparation requires less labial surface reduction, and the fired porcelain can be laid on the labial surface just as enamel is laid on the dentin, rather than being abutted to a joint. The thickness of the porcelain at the labiogingival margin may be accentuated safely. It is inconspicuous and tends to keep the gingiva healthy.

The interproximal and lingual shoulder can be prepared with a no. 955 end cutting bur. This instrument can be made by removing the side cutting flutes of a 34 inverted cone bur. The final finish is accomplished with a 6½ by 6½ by 9 hoe.

To establish a guide for grinding full porcelain veneer crowns to accurate balanced occlusion, the opposing teeth are painted with an oil base pigment such as Prussian blue thinned with eugenol or a thin sweet oil. Colored paper or cloth interposes bulk between the porcelain crown and the opposing tooth, thus creating a tendency to grind the completed crown out of occlusion.

A translucent white cement should be used for cementation of full porcelain veneer crowns. A colored cement will produce an unpredictable color change in the finished crown.

CENTRIC OCCLUSION AND THE FREEWAY SPACE

George H. Moulton. J. Pros. Den. 7:209 March 1957.

The freeway space is an all important criterion on which any restorative procedure that increases the length of the clinical crowns of a dentition must be based. This same principle applies to the construction of a splint or to any type of construction within the interocclusal distance.

A practical procedure for determining the freeway space is to take two measurements: first, the distance between the nasion and gnathion when the mandible is in physiologic rest position; and second, the distance between these points when the teeth are in centric occlusion. A freeway space of 3 mm. is the approximate minimum which must be maintained throughout all restorative procedures.

The establishment of "true centric occlusion" and an adequate freeway are essential to the success of any restorative treatment. The diagnosis of centric occlusion and the relationship of centric occlusion to the freeway space were of prime importance to the successful treatment of a patient who required orthodontic care and rehabilitation by means of crown and bridge prosthesis. Another patient was successfully treated by a relatively simple equilibration, prior to the construction of a partial denture, to restore physiologic occlusion.

The erroneous diagnosis that the bite was closed in two patients and the subsequent construction of a splint in each instance which did not allow for normal freeway space resulted in the intrusion of the posterior teeth into the bone.

The correction of all malocclusion and establishment of physiologic occlusion must be a part of treatment planning. The freeway space is a physiologic necessity and must be maintained after any treatment provided.

A. H. Grunewald

THE USE OF CHLORPROMAZINE IN GENERAL ANESTHESIA FOR OFFICE PROCEDURES

Stanford Stark. J. Oral Surg. 16:30 Jan. 1958.

Vomiting is caused by stimulation of the vomiting center in the medulla. In anesthesia, it is either a deficiency in the supply of oxygen (hypoxia) or of blood to this center which causes the center to be hyperexcitable.

Chlorpromazine was used as a premedicating drug to determine its effectiveness in eliminating or lessening postanesthetic vomiting in dental outpatients. Anesthetics were administered to four groups of patients. For each group, the premedication was oral, one-half to one hour before induction. The results were as follows:

Group I—83 patients; premedication—secobarbital sodium, 1.5 grains, chlorpromazine, 25 mg.; anesthetic—nitrous oxide-oxygen and trichloroethylene; occurrence of vomiting—14.4 per cent of patients.

Group II—128 patients; premedication—secobarbital sodium, 1.5 grains, chlorpromazine, 25 mg.; anesthetic—thiopental sodium, 2.5 per cent, with maintenance using nitrous oxide-oxygen and trichloroethylene; occurrence of vomiting—5.4 per cent of patients.

Group III—166 patients; premedication—secobarbital sodium, 0.75 grains, chlorpromazine, 50 mg.; anesthetic—thiopental sodium, 2.5 per cent, with maintenance using nitrous oxide-oxygen and trichloroethylene; occurrence of vomiting—4.1 per cent of patients.

Group IV—98 patients; premedication—secobarbital sodium, 1.5 grains; anesthetic—thiopental sodium, 2.5 per cent, with maintenance using nitrous oxide-oxygen and trichloroethylene; occurrence of vomiting—6.8 per cent.

Chlorpromazine did not significantly decrease postanesthetic vomiting. Perhaps the reason lies in the small dosages used. However, when 50 mg. was used, it put the patient in a better frame of mind, which made the administration of the anesthetic easier and safer. No untoward side effects of chlorpromazine were noted.

PREVENTIVE PERIODONTICS

J. F. Peters. Mil. Med. 120:423 June 1957.

Preventive periodontics is not limited to prophylactic scaling and patient education in oral hygiene, but instead includes all the elements of "good dentistry." Every dental officer, whether a specialist or a general practitioner, should offer good dental treatment to each patient.

A doctor does not practice "good dentistry" if he places fine precision mechanical devices in periodontally involved mouths. The pathetic situation is that often the patient is not even informed that there is a pathologic condition of the supporting structures of the teeth.

Even though periodontal disease is the most important single cause of loss of teeth, its prevention and treatment must be secondary to dental caries. The increase in man's expected life span makes it more important than ever that the dental profession be able to preserve the natural dentition for a longer period of time. In order to solve this problem, patients, too, must be educated to their roles in the achievement of "good dentistry" and they must be motivated to take proper care of their natural dentitions. The most difficult problem, however, is that of educating and motivating all dentists to the fact that early diagnosis and treatment of periodontal disease is of vital importance.

Since there are regular examinations in the military services, there is a better chance of detecting and treating periodontal conditions in a very early stage.

Periodontics has received more and more emphasis from the Navy Dental Corps, but preventive periodontal therapy remains the responsibility of the individual dental officer.

J. S. Millsap

LARYNGEAL STETHOSCOPE TO MONITOR THE RESPIRATORY EXCHANGE

Adrian O. Hubbell and William A. Wagner. J. Oral Surg. 16:20 Jan. 1958.

Anoxia is the greatest hazard in anesthesia. Obstructions that impair the airway should be detected and corrected immediately.

It is suggested that a stethoscope of special design applicable to oral surgical procedures be used to monitor respiratory exchange. The diaphragm is placed at the level of the glottis where an obstruction in the airway may be detected. The custom earpiece worn by the anesthetist may be exchanged for a standard bilateral earpiece so that the recovery nurse can monitor the respiratory exchange during emergence of the patient from anesthesia.

Positive, accurate and reliable methods of monitoring respiratory exchange will reduce the hazards of anesthesia incidental to hypoventilation.

CALCULUS, WEAR, AND ALVEOLAR BONE LOSS IN THE JAWS OF SIXTH CENTURY JUTES

D. C. A. Picton. D. Practitioner and D. Record 7:301 June 1957.

A study was conducted on 40 skeletons taken from a Jute cemetery near Lyminge, Kent, in England. A total of 734 teeth were examined to determine the distribution of calculus, attrition of the teeth, the loss of alveolar bone, irregularities of the teeth, caries index, probable diet and the estimated age. Age was determined by the degree of tooth and skeleton development and by the amount of suture closure and attrition of the teeth.

Calculus was found in 19 skulls, 10 of which showed a moderate amount and one a gross amount. Attrition was found on all the teeth with only three skeletons (all under 14 years of age) showing minor wear. Eighteen mandibles were studied to determine the type of wear. Two showed the normal Monson curve, one had a flat plane and 15 showed the anti-Monson curve. Proximal wear was found in all teeth. Age did not seem to affect the size of the facet until occlusal wear reached the contact zone.

Alveolar bone loss was not significantly affected by an increase of age.

There were minor irregularities of the teeth and two mandibles had both lower third molars missing but no third molar impaction was found.

Caries were found in 13 skulls (26 teeth involved) out of 40 (total 734 teeth) with only one skeleton from the under 40 age group. This higher caries index in the older age group was caused by excessive attrition.

The diet probably consisted mainly of meat and flour. The flour was ground by sandstone quern, which may be the important factor in the excessive amount of attrition of the teeth.

J. S. Millsap

AN OUTSIDER LOOKS AT DENTISTRY

A. C. Lewis, M.A., D. Paed. J. Canad. D.A. 23:331 June 1957.

Ancient history of every civilization mentions treatment of dental disorders. The main value of history, however, is to avoid repetition of the mistakes of the past.

With this in mind, the survey committee of the Council on Dental Education of the Canadian Dental Association conducted an examination of the five universities in Canada which house dental schools. In Canada, the first formal approach to dental education was through the Royal College of Dental Surgeons of Ontario, incorporated in 1868. Dental education now is conducted by five Faculties of Dentistry.

Some of the major developments which resulted from the exhaustive survey include replacement of much obsolete equipment in laboratories and clinics and a program to increase the number of facilities so that the number of dental students and dental hygiene students can be increased.

The committee also made observations and recommendations on the relationship between dental education and dental public health care. It is necessary too for the profession to keep well informed on the subject of oral ills and methods of combating them. One of the first steps is to concentrate on the broad field of public health by organizing within the school a highly coordinated program of prevention. The Canadian Dental Association says that public oral health programs should be supervised wherever possible by a trained

public health dentist and that it should be part of the over-all community health program.

From a layman's point of view, the dental profession has increased in stature and has earned the thanks of the public as a result of its stand in favor of fluoridation.

Theodore C. Levitas

ORAL OPERATIVE PROCEDURES IN THE PRESENCE OF TOTAL ADRENALECTOMY

John D. Piro, D.D.S.; Florian Yandel, M.D., and Austin H. Kutscher, D.D.S. J. Oral Surg. 16:63 Jan. 1958.

Bilateral surgical adrenalectomy, and in some instances, medical adrenalectomy, have been carried out with increasing frequency in recent years for the control of certain types of carcinoma and for other diseases. Today there are an increasing number of patients with no adrenal glands or with atrophied, poorly functioning, or nonfunctioning adrenal glands who must undergo oral operative procedures.

Four patients underwent oral operative procedures after previously performed total bilateral adrenalectomy, which operation had necessitated maintenance of these patients exclusively on corticosteroid replacement therapy.

Each patient undergoing oral operative procedures must be provided with sufficient corticosteroid drug therapy to cover the extra stress precipitated by the procedure. This, in general, should be 100 to 250 mg. cortisone by mouth in divided doses (in addition to the maintenance dose) during the preoperative 24 hour period and 100 to 300 mg. cortisone by mouth or hydrocortisone intravenously on the day of surgery.

The opinion among both dental and medical professions with regard to the effect of oral surgical procedures on the stress system of the body should be reoriented.

CHRONIC OSTEOMYELITIS OF THE MANDIBLE: REPORT OF A CASE

Richard L. Verbic and Sundar J. Vazirani. J. Oral Surg. 16:160 March 1958.

A case report of chronic osteomyelitis of the mandible is presented. The history dates to 1939 when the patient had all of his teeth removed with the exception of the lower right and left third molars. An upper complete denture and lower partial denture were constructed at that time. Periodic episodes of swelling and pain in the left body of the mandible followed for a period of 12 years.

Roentgenographic examination in 1951 by a dental clinic revealed the presence of a "slight area of erosion" in the lower left first molar region. Treatment at that time consisted of irrigation with benzalkonium chloride solution.

The patient was seen at the University of Illinois Research and Educational Hospital (Oral Surgery Clinic) for the first time on Sept. 3, 1955. Roentgenograms of the mandible showed a large, irregular defect with considerable destruction of the alveolar process in the left first and second molar region, extending to and involving the inferior alveolar canal. Oral examination revealed a localized, fluctuant swelling. The overlying mucosa was thick and keratotic with negroid pigmentation. The bacteriologic culture of the purulent discharge contained abundant *Staphylococcus pyogenes* var. *aureus*, alpha streptococci, Neisseria, and a few micrococci. The tentative diagnosis was low-grade, chronic osteomyelitis of the mandible.

Treatment consisted of debriding and saucerizing the wound. The mandibular nerve and vessels were identified in the posteroinferior end of the defect, although postoperative paresthesia was not present.

The biopsy diagnosis was reported as a low-grade chronic osteomyelitis.

Postoperative roentgenograms were taken three months and one year after surgery. Moderate bone regeneration was noted roentgenographically and no evidence of recurrence of the osteomyelitis was noted.

ORIENTATION OF THE CRYSTALLITES IN HUMAN DENTAL ENAMEL. I

D. G. Lyon and A. I. Darling. Brit. D. J. 102:483 June 18, 1957.

The crystallites in the prisms from buccolingual sections of three different teeth, studied in polarized light, showed a mean deviation of crystallites from the prism direction of 18 ± 7 degrees. In all sections, the angle of deviation of the crystallites was greater near the dentinoenamel junction and at the periphery than near the middle. There was less preferred orientation of crystallites in the inner and outer zones. The outer pole of the crystallites deviated away from the cusp toward the cervical margin in all sections.

Henry M. Leicester

Deaths

Adkerson, Morton P., Fairfax, Va.; Medical College of Virginia School of Dentistry, 1936; died November 11; age 53.

Alexander, David S., Chicago; Northwestern University Dental School, 1924; died September 16; age 62.

Anderson, Marvin D., New York; College of Physicians and Surgeons, San Francisco, 1956; died November 13; age 27.

Anderson, Raymond H., Duluth, Minn.; University of Minnesota School of Dentistry, 1918; died October 7; age 60.

Appleby, John Key, Los Gatos, Calif.; Tacoma College of Dental Surgery, 1899; died November 3, age 84.

Bailey, Clinton L., Wichita Falls, Texas; State Dental College, 1914; died October 15; age 65.

Banister, Charles M., New Orleans; Tulane University School of Dentistry, 1924; died November 14; age 60.

Barkelew, Berneice L., Riverside, Calif.; University of Southern California, School of Dentistry, 1926; died November 15; age 57.

Beatty, William J., Butler, Pa.; University of Maryland Dental Department, 1892; died October 31; age 89.

Bell, Benjamin R., Dania, Fla.; Atlanta-Southern Dental College, 1926; died August 10; age 60.

Bell, Frank J., Billings, Mont.; University of Iowa, College of Dentistry, 1903; died November 5; age 77.

Belscamper, Charles L., St. Charles, Minn.; Chicago College of Dental Surgery, 1900; died August 31; age 85.

Billig, Edwin A., Dousman, Wis.; Chicago College of Dental Surgery, 1897; died March 25; age 80.

Boone, James R., Bardstown, Ky.; Louisville, College of Dentistry, 1907; died November 19; age 72.

Bow, Howard G., Deland, Fla.; Vanderbilt University School of Dentistry, 1899; died September 20; age 80.

Brown, Robert J., Norfolk, Va.; Meharry Medical College School of Dentistry, 1911; died June 12; age 73.

Brunk, Henry J., Millington, Mich.; Starling-Ohio Medical College, Department of Dentistry, 1912; died November 3; age 69.

Bull, Elmer M., Greensburg, Ind.; Indiana Dental College, 1912; died November 20; age 73.

Bunch, Lonnie G., Newark, N. J.; Howard University College of Dentistry, 1916; died November 17; age 75.

Cavell, William H., Carson City, Nev.; University of California College of Dentistry, 1894; died November 11; age 85.

Cieszynski, Henry J., New Britain, Conn.; Tufts College Dental School, 1924; died October 24; age 58.

Cleary, William A., Orlando, Fla.; Boston Dental College, 1899; died October 27; age 79.

Colburn, Walter H., Sparta, N. J.; New York College of Dentistry, 1894; died October 28; age 85.

Coolbaugh, Edwin P., Ridgewood, N. J.; Baltimore College of Dental Surgery, 1920; died November 5; age 63.

Crockett, Burr R., Westfield, Wis.; University of Illinois College of Dentistry, 1918; died November 22.

Crowley, Charles W., Boston; Harvard Dental School, 1922; died November 15; age 58.

Dann, Forrest A., Round Lake, Ill.; University of Illinois College of Dentistry, 1919; died November 13; age 62.

Dillard, William L., Madill, Okla.; New Orleans Dental College, 1907; died July 28; age 73.

Dixon, Charles H., Wewoka, Okla.; University of Nebraska College of Dentistry, 1927; died August 18; age 66.

Dowd, Charles W., Indianapolis; Louisville College of Dentistry, 1915; died November 21; age 71.

Drummond, John F., Gary, Ind.; Northwestern University Dental School, 1914; died October 13; age 65.

Ebersperger, Louis H., Wheaton, Ill.; Indiana College of Dentistry, 1928; died October 16; age 57.

Edmondson, John D., Purcellville, Va.; Medical College of Virginia School of Dentistry, 1940; died October 25; age 44.

Elliott, John A., Kansas City, Mo.; Indiana Dental College, 1918; died November 1; age 62.

Englander, Henry, Long Branch, N. J.; College of Dental and Oral Surgery, 1915; died November 14; age 73.

Erickson, Rudolph, Escanaba, Mich.; Northwestern University Dental School, 1924; died October 23; age 61.

Euler, William H., Topeka, Kan.; Kansas City Dental College, 1918; died October 19; age 64.

Fader, Clementine L., New York; College of Dental and Oral Surgery, 1918; died November 16; age 63.

Fall, Edward M., Newton, Mass.; Tufts College Dental School, 1903; died November 7; age 82.

Fay, Clifford T., Minneapolis; Northwestern University Dental School, 1915; died October 14; age 66.

Fitzpatrick, John J., Boston; University of Maryland Dental Department, 1912; died May 26; age 69.

Fleming, John T., Bridgeport, Conn.; Tufts College Dental School, 1931; died November 27; age 51.

Foster, James M., Minneapolis; University of Minnesota School of Dentistry, 1919; died August 29; age 69.

Foster, Robert C., Boston; Tufts College Dental School, 1912; died October 30; age 70.

Fowler, Bayard L., Denver; University of Denver School of Dentistry, 1917; died September; age 70.

Francis, James C., Longview, Texas; Vanderbilt University School of Dentistry, 1906; died November 13; age 76.

Francis, Melville F., Malden, Mass.; Tufts College Dental School, 1904; died October 18; age 76.

Franklin, Charles C., Jr., Santa Barbara, Calif.; University of California College of Dentistry, 1952; died October 10; age 37.

Frick, Bertney G., New Orleans; New Orleans Dental College, 1909; died October 20; age 76.

Friedman, Benjamin T., Omaha; Northwestern University Dental School, 1917; died July 16; age 65.

Friedman, Henry J., Cleveland Heights; Ohio Medical University College of Dentistry, 1906; died November 15; age 74.

Galbraith, E. J., Kerrville, Texas; died November 6; age 86.

Geiser, Walter A., Dunkirk, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1919; died July 29; age 59.

Gemski, Henry J., New Haven, Conn.; Baltimore College of Dental Surgery, 1938; died October 20; age 46.

Gilpatrick, Ora E., Mars Hill, Maine; University of Maryland Dental Department, 1914; died November 9; age 66.

Goodner, B. B., Cleveland, Tenn.; died October 25; age 61.

Greenberg, John, San Antonio, Texas; State Dental College, 1911; died July 6; age 71.

Gregory, Benjamin F., San Antonio, Texas; died August 4; age 76.

Hadley, Walter W., Oakland, Calif.; College of Physicians and Surgeons, 1927; died November 10; age 62.

Hall, Frank B., Butte, Mont.; died October 17; age 70.

Harper, Jesse R., Coffeyville, Kan.; Kansas City Dental College, 1919; died September 19; age 62.

Hayashi, Hideki, Berkeley, Calif.; University of California College of Dentistry, 1921; died November 8; age 57.

Henderson, George W., Saybrook, Ill.; Northwestern University Dental School, 1913; died October 11; age 67.

Higgins, Robert C. D., Coeur D'Alene, Idaho; University of Minnesota School of Dentistry, 1910; died October 26; age 79.

Hinkle, Victor V., Kansas City, Mo.; Kansas City Dental College, 1915; died October 24; age 68.

Hogan, Gerald L., Lake Orion, Mich.; University of Detroit School of Dentistry, 1935; died July 30; age 56.

House, C. H., Arkansas City, Kan.; Kansas City Dental College, 1899; died October 19; age 79.

Huff, Walter J., Peru, Ind.; Indiana Dental College, 1911; died May 5; age 68.

Imrie, Albert N., Berkley, Mich.; Detroit College of Medicine Department of Dental Surgery, 1909; died November 18; age 72.

Ingram, John S., Tulsa, Okla.; Kansas City Dental College, 1913; died November 14; age 64.

Jack, Charles S., Philadelphia; University of Pennsylvania School of Dentistry, 1899; died November 5; age 83.

Jacobson, Arthur C., Minneapolis; University of Minnesota School of Dentistry, 1926; died July 15; age 54.

Jent, James A., Pittsburg, Kan.; University of Illinois College of Dentistry, 1906; died October 20; age 77.

Johnson, Benjamin E., St. Paul; University of Illinois College of Dentistry, 1911; died August 27; age 68.

Johnson, Nelson L., Renville, Minn.; University of Minnesota School of Dentistry, 1902; died October 22; age 77.

Jones, John C., Kansas City, Mo.; Western Dental College, 1919; died November 4; age 60.

Jones, Vinton, Browning, Mo.; Western Dental College, 1917; died October 20; age 65.

Joslin, Manley A., New York; University of Pennsylvania School of Dentistry, 1901; died October 5; age 77.

Kaston, Louis, Boston; Tufts College Dental School, 1912; died April 23, 1957; age 71.

Keefe, John E., North Branch, N. J.; Tufts College Dental School, 1909; died November 1; age 71.

Kester, Alford B., Dayton, Ohio; Starling-Ohio Medical College, Department of Dentistry, 1911; died October 20; age 67.

Kilduff, Gilbert, Waterbury, Conn.; Temple University School of Dentistry, 1909; died December 4; age 70.

Kinch, Frederick J., Worcester, Mass.; Baltimore College of Dental Surgery, 1927; died June 26; age 61.

Klein, George H., Glasgow, Mont.; Louisville College of Dentistry, 1897; died October; age 86.

Knolle, Bennie B., Houston, Texas; Louisville College of Dentistry, 1902; died October 26; age 76.

Kolb, Emery G., Essexville, Mich.; Northwestern University Dental School, 1936; died November 23; age 46.

Kramer, Harry D., Brooklyn; New York College of Dentistry, 1918; died September 26; age 66.

Larson, Albert B., Del Mar, Calif.; Northwestern University Dental School, 1934; died November 29; age 48.

Leeper, Samuel M., New Concord, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1901; died October 26; age 89.

Lewis, Robert J., Somerset, Mass.; died November 16; age 80.

Lief, Joseph, New Rochelle, N. Y.; New York College of Dentistry, 1917; died October 28; age 61.

Lightner, Carl A., Mansfield, Ohio; University of Pittsburgh School of Dentistry, 1957; died November 18; age 28.

Loftus, John L., Hartford, Conn.; University of Maryland Dental Department, Baltimore, 1905; died November 3; age 77.

Mackey, William T., Lenox, Mass.; Georgetown University School of Dentistry, 1912; died November 15; age 65.

Manning, Leo K., St. Louis; St. Louis University School of Dentistry, 1918; died October 23; age 61.

Martin, Herbert B., Jr., San Francisco; University of Southern California, School of Dentistry, 1956; died November 14.

McCaul, Fred L., West Yarmouth, Mass.; Tufts College Dental School, 1919; died October 26; age 58.

McDonald, William H., Rio Grande City, Texas; Kansas City Dental College, 1916; died November 4; age 74.

McHenry, William A., Nelson, Neb.; University of Nebraska College of Dentistry, 1906; died November 15, age 71.

McKey, Arthur D., Hillsboro, Ind.; Indiana Dental College, 1908; died July 20; age 75.

McKim, Frank E., Jr., Marietta, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1913; died October 16; age 68.

Medlin, John Roy, Tallulah, La.; Atlanta-Southern Dental College, 1926; died August 1; age 60.

Montgomery, William S., Cincinnati; died August 23; age 86.

Neill, Louis A., Decatur, Ala.; Tennessee Medical College Dental Department, 1894; died July 18; age 88.

Nelson, Carl W., San Clemente, Calif.; University of Minnesota School of Dentistry, 1918; died July 29; age 60.

Nelson, Ray H., Missoula, Mont.; University of Minnesota School of Dentistry, 1910; died October 22; age 68.

O'Hearn, Leo J., Pittsfield, Mass.; Baltimore College of Dental Surgery, 1913; died November 22; age 65.

Pan Kratz, Peter J., Stafford, Kan. died October 3; age 81.

Parker, Aloysius A., Brooklyn; University of Pennsylvania School of Dentistry, 1918; died November 21; age 69.

Parmenter, George A., Petoskey, Mich.; University of Michigan School of Dentistry, 1895; died October 20; age 86.

Pattillo, Robert L., Moultrie, Ga.; Atlanta-Southern Dental College, 1919; died November 8.

Pattridge, Mark O., Minneapolis; University of Minnesota, School of Dentistry, 1910; died July 27; age 68.

Petersen, Leonard L., Hudson, Wis.; Marquette University Dental School, 1918; died November 21; age 65.

Phillips, John H., Nashville, Tenn.; Vanderbilt University School of Dentistry, 1901; died November 17; age 87.

Plater, Joseph R., San Francisco; Marquette University Dental School, 1928; died October 26; age 54.

Pratt, Harry K., Appleton, Wis.; Wisconsin College of Physicians and Surgeons, Department of Dental Surgery, 1902; died November 6; age 79.

Rahill, Daniel F., Buffalo; University of Buffalo, School of Dentistry, 1923; died November 18; age 56.

Ray, Horace C., Lorain, Ohio; University of Tennessee College of Dentistry, 1933; died November 16; age 53.

Rea, Victor H., Elgin, Ill.; University of Illinois College of Dentistry, 1892; died July 14; age 90.

Regan, John A., Madison, Wis.; Chicago College of Dental Surgery, 1903; died June 12; age 75.

Richardson, Erwin L., Detroit; University of Michigan School of Dentistry, 1909; died August 20; age 70.

Ridenour, Irving, Carmel, Calif.; University of California College of Dentistry, 1922; died November 24; age 58.

Roberts, Edward C., Centralia, Wash.; North Pacific College of Oregon School of Dentistry, 1915; died November 10; age 65.

Robinson, Ashby C., Pittsburgh; University of Pittsburgh School of Dentistry, 1917; died November 2; age 64.

Robinson, Philip C., Brooklyn; Harvard Dental School, 1924; died November 16; age 65.

Rodgers, Henry H., Mt. Vernon, Ala.; Atlanta-Southern Dental College, 1923; died November 16; age 64.

Roland, Daniel L., Reading, Pa.; Baltimore College of Dental Surgery, 1921; died November 9; age 65.

Ross, Robert A., North Fort Myers, Fla.; University of Michigan School of Dentistry, 1918; died November 20; age 76.

Ross, William E., San Leandro, Calif.; University of California College of Dentistry, 1914; died November 2; age 80.

Roth, Alton J., Flemington, N. J.; University of Pittsburgh School of Dentistry, 1931; died November 23; age 52.

Ryan, Christopher A., Piedmont, W. Va.; Baltimore College of Dental Surgery, 1919; died September 8; age 62.

Saunders, Edwin E., Plainfield, N. J.; University of Pennsylvania School of Dentistry, 1916; died November 19; age 66.

Scott, Lisle C., Emmetsburg, Iowa; Indiana Dental College, 1915; died November 11; age 64.

Seiler, Ira D., Orange City, Fla.; Ohio Medical University College of Dentistry, 1902; died August 9; age 79.

Shenefield, Paul R., San Francisco; University of Southern California School of Dentistry, 1924; died November 14; age 56.

Siegmund, Rudolph J., Bedford, Ind.; Indiana Dental College, 1902; died November 8; age 77.

Skivington, John Keever, Stockton, Calif.; North Pacific College of Oregon School of Dentistry, 1924; died October 20; age 59.

Smith, Albert J., Lebanon, Ky.; Louisville College of Dentistry, 1908; died October 16; age 85.

Smith, Harry W., Washington, D. C.; Baltimore College of Dental Surgery, 1923; died October 5; age 57.

Southwood, Raymond P., Detroit; Detroit College of Medicine, Department of Dental Surgery, 1906; died September 30; age 71.

Speidel, Thomas D., Minneapolis; University of Iowa College of Dentistry, 1930; died November 30; age 49.

Steele, Howard M., Bradenton, Fla.; University of Pittsburgh School of Dentistry, 1918; died November 9; age 64.

Stephens, Robert C., Earlington, Ky.; Ohio College of Dental Surgery, University of Cincinnati, 1914; died November 3; age 64.

Stewart, Robert K., Kitchener, Ontario, Canada; Detroit College of Medicine Department of Dental Surgery, 1906; died October 16; age 75.

Stickrath, Chilson Milo, Marietta, Ohio; Ohio State University College of Dentistry, 1923; died February 7, 1957; age 60.

Stowe, Lewis R., New York; University of Minnesota School of Dentistry, 1916; died November 4; age 64.

Sullivan, Charles R., Pittsfield, Mass.; University of Pennsylvania School of Dentistry, 1903; died September 26.

Swenson, Earl A., Prescott, Ariz.; University of Southern California School of Dentistry, 1916; died September 11; age 65.

Szatkowski, Edmund M., West Point, N. Y.; University of Buffalo School of Dentistry, 1955; died October 7; age 33.

Tanner, Smith C., Leland, Miss.; Tulane University School of Dentistry, 1911; died October 9; age 75.

Tate, Bird A., Larned, Kan.; St. Louis University School of Dentistry, 1923; died November 3; age 60.

Taylor, Royal W., Pittsburgh; Howard University College of Dentistry, 1917; died July 14; age 63.

Thorsness, Gilbert C., Minneapolis; Northwestern University Dental School, 1905; died September 15; age 80.

Thomas, Raymond B., Washington, D. C.; Howard University College of Dentistry, 1915; died October 15; age 63.

Tobin, Thomas W., Mobile, Ala.; Meharry Medical College School of Dentistry, 1918; died October 30; age 68.

Toujan, Jean Oscar, Houma, La.; Baltimore College of Dental Surgery, University of Maryland, 1898; died February 19, 1957; age 80.

Trieff, Simon, Brooklyn; Columbia University School of Dental and Oral Surgery, 1924; died October 27; age 56.

Tunison, Burton M., Hendersonville, N. C.; Northwestern University Dental School, 1898; died April 4; age 87.

Turner, James E., Chesterfield, S. C.; Atlanta-Southern Dental College, 1924; died October 14; age 58.

Tyler, John E., Worcester, Mass.; University of Maryland Dental Department, Baltimore, 1917; died November 24; age 67.

Ude, Arthur W., St. Paul; University of Minnesota School of Dentistry, 1927; died November 19; age 54.

Ury, Lewis B., Chicago; Chicago College of Dental Surgery, 1908; died May 14; age 75.

Van Deusen, Orville, Winchester, Va.; Columbian University Dental Department, 1898; died August 17; age 88.

Van Horn, Walter Graham, Philadelphia; Philadelphia Dental College, 1892; died June 11; age 90.

Varker, Ray L., Madison, Wis.; Northwestern University Dental School, 1918; died September 18; age 65.

Vaughan, Christopher C., Jr., Richmond, Va.; Medical College of Virginia School of Dentistry, 1910; died December 1; age 70.

Vaughn, Ross B., Monmouth, Ill.; St. Louis University School of Dentistry, 1912; died August 25; age 68.

Virostek, Milan Richard, Library, Pa.; University of Pittsburgh School of Dentistry, 1927; died October 1; age 52.

Voils, Victor V., Mooresville, N. C.; Atlanta-Southern Dental College, 1923; died November 2; age 58.

Walker, William E., Chatham, N. Y.; Baltimore College of Dental Surgery, University of Maryland, 1889; died August 18; age 88.

Wallace, John R., Winchester, Mass.; Harvard Dental School, 1922; died October 17; age 57.

Warrick, Richard J., Philadelphia; Pennsylvania College of Dental Surgery, 1900; died December 17; age 77.

Waterson, Jay P., Lancaster, Pa.; Pennsylvania College of Dental Surgery, 1902; died October 4; age 77.

Waynick, George E., Winston-Salem, N. C.; Baltimore College of Dental Surgery, University of Maryland, 1917; died November 22; age 65.

Weideman, George C., Milwaukee; University of Michigan School of Dentistry, 1905; died December 22; age 77.

Weiner, Harry A., Philadelphia; Temple University School of Dentistry, 1920; died April 9; age 59.

Weissman, Ralph, Oceanside, N. Y.; New York College of Dentistry, 1924; died October 24; age 57.

Welch, Adelbert A., Battle Creek, Mich.; Chicago College of Dental Surgery, 1900; died November 17; age 81.

Wendt, Otto A., Marine City, Mich.; University of Michigan School of Dentistry, 1932; died November 1; age 50.

Werrick, Joseph P., Minneapolis; University of Minnesota School of Dentistry, 1913; died November 5; age 65.

West, William E., Detroit; Chicago College of Dental Surgery, 1905; died October 31; age 74.

Weston, Henry F., Brockton, Mass.; Harvard Dental School, 1918; died November 28; age 60.

Whinery, Lindley D., Quincy, Mass.; died July 20; age 82.

White, Wilbur M., Salina, Kan.; Kansas City-Western Dental College, 1920; died November 13; age 63.

Whited, Carl V., Mendocino, Calif.; College of Physicians and Surgeons, 1919; died November 1; age 64.

Whittle, Donald F., Long Beach, Calif.; Tufts College Dental School, 1930; died November 2; age 50.

Williams, Paul L., Wilmington, Ohio; St. Louis University School of Dentistry, 1932; died October 13; age 51.

Williamson, Adna D., Mansfield, Mass.; Tufts College Dental School, 1923; died June 23; age 56.

Willis, Bennett R., Bassett, Va.; Medical College of Virginia School of Dentistry, 1929; died October 27; age 56.

Wills, James C., Kansas City, Mo.; Indiana Dental College, 1912; died November 19; age 74.

Wilson, James C., East St. Louis, Ill.; Washington University School of Dentistry, St. Louis, 1911; died November 11; age 69.

Wilson, John H., Quanah, Texas; died August 31; age 91.

Wilson, Wiley H., Conesus, N. Y.; University of Buffalo School of Dentistry, 1903; died November 26; age 78.

Wisehart, O. M., Fargo, N. D.; Atlanta Dental College, 1899; died October 21; age 86.

Wood, George L., Genesco, Ill.; University of Iowa College of Dentistry, 1898; died August 29; age 81.

Wroble, Ray J., Chicago; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1931; died October 16; age 49.

Wyman, Mattie K., Seattle; Northwestern University Dental School, 1905; died November 7; age 85.

Yerkes, Harman, Philadelphia; Philadelphia Dental College, 1887; died March 9, 1957; age 94.

Yost, George W., Los Angeles; University of Southern California School of Dentistry, 1924; died September 28; age 56.

Young, John H., Carsonville, Mich. Philadelphia Dental College, 1890; died October 15; age 88.

Zaccardo, Dominic A., Stamford, Conn.; Vanderbilt University School of Dentistry, 1925; died June 21; age 57.

Zaves, Henry R., Brooklyn; New York University College of Dentistry, 1937; died October 10; age 50.

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Pedodontics: Francis W. Summers, 662 S. Western Ave., Los Angeles

Periodontics: Erwin M. Schaffer, Medical Arts Bldg., Minneapolis

Practice Administration: Jay H. Eshleman, 6414 Germantown Ave., Philadelphia

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Prosthodontics, Partial: George E. Emig, 3900 Reservoir Road, N.W., Washington, D.C.

Public Health Dentistry: David F. Striffler, State Health Department, P.O. Box 711, Santa Fe, N. Mex.

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Roentgenology: Arthur H. Wuehrmann, School of Dentistry, University of Alabama, Birmingham, Ala.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 14-18, 1959	New York
One-Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	Oct. 16-19, 1961	Philadelphia

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 24-26	Montgomery	C. R. Crook	Professional Center, Montgomery
Alaska	June 3-6	Palmer	C. L. Polley	Box 1896, Juneau
Arizona	Apr. 16-19	Tucson	W. G. Burke	15 E. Monroe St., Phoenix
Arkansas	Apr. 13-16	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 20-23	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 14-16	Los Angeles	S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 5-8	Colorado Springs	G. H. Jackson	724 Republic Bldg., Denver
Connecticut	May 14, 15	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			A. G. Schick	3716 Philadelphia Pike, Claymont
District of Columbia			J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 18-21	Miami Beach	G. J. Perdigon	17 Davis Blvd., Tampa
Georgia	Oct. 12-15	Atlanta	F. M. Butler, Jr.	Bankers Insurance Bldg., Macon
Hawaii	June 15-19	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	June 16-18	McCall	G. L. Williamson	1003½ Main St., Boise
Illinois	May 11-14	Springfield	P. W. Clopper	632 Jefferson Bldg., Peoria
Indiana	May 19-21	Indianapolis	W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa	May 5-7	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 5-8	Kansas City, Mo.	F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky			A. B. Coxwell, Jr.	2208 Dundee Rd., Louisville 5
Louisiana	Apr. 9-12	Monroe	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 19-21	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 4-7	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 4-7	Boston	H. E. Tingley	12 Bay State Rd., Boston 15
Michigan	Apr. 28-30	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 14-16	St. Paul	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4
Mississippi	June 9-11	Biloxi	B. A. Cohen	500-E E. Woodrow Wilson Dr Jackson 27
Missouri	May 4-8	Kansas City	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 1-3	Butte	R. C. Ritter	28 N. Black St., Bozeman
Nebraska	Apr. 28-30	Omaha	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	June 12-15	Lake Tahoe	O. M. Seifert	755 Ryland Ave., Reno
New Hampshire	June 22-24	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 18-21	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 25-28	Las Cruces	J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York	May 12-14	Buffalo	C. A. Wilkie	1 Hanson Pl., Brooklyn 17
North Carolina	May 4-7	Pinehurst	L. H. Butler	Jefferson Bldg., Greensboro
North Dakota	May 4-7	Bismarck	J. H. Pfister	419½ Dakota Ave., Wahpeton

State	Date	Place	Secretary	Address
Ohio	Sept. 28-Oct. 1	Cincinnati	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20-23	Oklahoma City	L. D. Wright	Osler Bldg., Oklahoma City
Oregon			T. D. Holder	Selling Bldg., Portland
Panama Canal Zone	Apr.	Ancon	W. R. Bond, Jr.	U.S.A., Ft. Kobbe Dental Clinic, Ft. Kobbe
Pennsylvania	May 21-23	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			R. Borges	Box 843, Arecibo
Rhode Island	Jan. 20, 21, 1959	Providence	H. A. McGuirl	Union Trust Bldg., Providence
South Carolina	May 25-27	Myrtle Beach	J. E. Wallace	1506 Gregg St., Columbia
South Dakota	May 11-13	Mitchell	R. E. Decker	Box 308, Parker
Tennessee	May 12-15	Chattanooga	K. P. Ezell	116 N. Academy, Murfreesboro
Texas	May 3-6, 1959	San Antonio		
Utah	May 22-24	Salt Lake City	R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont	June 27-29	Manchester	E. H. Van Santvoord	22 Washington St., Rutland
Virginia	May 4-7	Richmond	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington			H. B. Henderson	211 Medical Dental Bldg., Seattle 1
West Virginia	July 20-23	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 21-23	Milwaukee	H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June 19-21	Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 22-27* June 23, 24	Birmingham	W. L. McCarty	Professional Center, Montgomery
Alaska			R. H. Williams	Box 2122, Juneau
Arizona	June 23-30	Florence	W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas	June 16-20	Little Rock	W. T. Jones	107 E. Shelton, Monticello
California	June 16 June 23	San Francisco Los Angeles	D. R. Grant	507 Polk St., San Francisco
Colorado	June 22-28	Denver	R. F. Gilmore	Republic Bldg., Denver 2
Connecticut	June 23-25* June 27, 28* June 26† June 27, 28†	Boston Bridgeport Bridgeport Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 30*† July 1-3*†	Philadelphia Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	1835 Eye St., N.W., Washington
Florida	July 6-17* July 7, 8†	Jacksonville	R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia	June 9-11	Atlanta	W. G. Brown	Blackshear
Hawaii	Aug. 28-Sept. 1‡		J. Y. Ing	James Campbell Bldg., Honolulu
Idaho	June 23-25	Boise	A. G. DeWinter	Sun Bldg., Boise
Illinois	June 24-27	Chicago	W. A. McKee	Wood Bldg., Benton
Indiana	June 10-13*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	June 2-6*†	Iowa City	P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas	June 2-5	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 9-12*†	Louisville	J. J. Kelly	102 W. Madison St., Franklin
Louisiana	June 2-7	New Orleans	R. C. Steib	Maison Blanche Bldg., New Orleans
Maine			A. S. Appleby	Box 260, Skowhegan
Maryland	June 9-11‡		W. D. Burton	829 Park Ave., Baltimore 1
Massachusetts	June 9-13*‡ June 12, 13†‡		C. R. Williams	70 Washington St., Salem
Michigan	June 8-14		J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota	June 16-20‡		E. A. Nelson	2236 Marshall Ave., St. Paul 4
Mississippi	June 17-19*†	Jackson	A. H. Richter, Jr.	Aven Bldg., Greenwood
Missouri	June 9-11, 16, 17* June 12-14, 16-17*	Kansas City St. Louis	R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena

State	Date	Place	Secretary	Address
Nebraska	June 5-11	Lincoln	H. E. Weber	Stuart Bldg., Lincoln
Nevada	June 16	Reno	R. Whitehead	40 W. First St., Reno
New Hampshire	June 19, 20*	Boston	S. G. Markos	8 Renaud Ave., Dover
	June 19†			
New Jersey	June 5, 6*	New York	C. J. Schweikhardt	150 E. State St., Trenton 8
	June 9, 10*	Philadelphia		
	June 13, 14*	Trenton		
	June 18†	Teaneck		
	June 23, 24*	Philadelphia		
New Mexico	June 23-26	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	June 19, 24, 25†‡		D. W. Beier	23 S. Pearl St., Albany 7
	June 19, 20, 24-27*‡			
	Dec. 2-5, 8, 9*‡			
North Carolina	June 23*†	Chapel Hill	J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 7-11	Fargo	G. F. Wirtz	Clinic Bldg., Mandan
Ohio	June 12-14*	Cleveland	D. E. Bowers	322 E. State St., Columbus 15
	June 18-20*	Columbus		
	June 21-25*	Columbus		
	June 21†	Columbus		
Oklahoma	June 23-25*	Oklahoma City	W. H. Stephens	Plaza Court Bldg., Oklahoma City
	June 23, 25†			
Oregon	June 9-12	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	May 26-28*†	Pittsburgh	R. E. V. Miller, Sr.	Dept. of Public Instruction, Box 911, Harrisburg
	June 5-7*†	Philadelphia		
	June 16, 17*†	Philadelphia and Pittsburgh		
	June 18-20*†	Philadelphia		
Puerto Rico			J. Mercado C.	Comercio St. #452, San Juan
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina	June 19-21‡		W. J. Brockington	1508 Washington St., Columbia 1
South Dakota	June 22-25*†	Sioux Falls	H. T. Aker	Canton
Tennessee	June 9-13	Memphis	C. R. Aita	Bennie-Dillon Bldg., Nashville
Texas	June 7-13*	Dallas	R. T. Weber	Capital National Bank Bldg., Austin 16
	June 7-9†			
Utah	June 23-28‡		M. T. Rigby	47 E. Center St., Midvale
Vermont	June 23-25*†	Burlington	P. M. Fitch	Newport
Virginia			J. M. Hughes	Medical Arts Bldg., Richmond
Washington			F. S. Rotchford	1108 S. Washington St., Olympia
West Virginia	June 23-25	West Liberty	C. C. Cottrill	Box 111, Glen Rogers
Wisconsin	June 9-13*†	Milwaukee	S. F. Donovan	Tomah
Wyoming	June 23-25*†‡		E. E. Edwards	Bank of Commerce Bldg., Sheridan

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	May 5-9	Detroit	W. L. Warburton Secy.	Medical Arts Bldg., Salt Lake City 11
American Academy of Dental Medicine	May 29-31	Montreal, Canada	G. J. Witkin Secy.	45 S. Broadway, Yonkers 2, N. Y.
American Association for Cleft Palate Rehabilitation	Apr. 24-26	San Francisco	D. C. Spriestersbach Secy	Dept. of Otolaryngology, University Hospitals, Iowa City
American Association of Industrial Dentists	Apr. 21-23	Atlantic City, N. J.	E. R. Aston Secy.	Pennsylvania Dept. of Health, P. O. Box 90, Harrisburg, Pa.
American Association of Orthodontists	Apr. 27-May 1	New York	E. E. Shepard Secy.	8230 Forsyth Blvd., St. Louis 24
American Board of Dental Public Health	Nov. 6, 7	Dallas, Texas	C. V. Tossy Secy.	Michigan Dept. of Health, Lansing, Mich.
American Board of Oral Surgery	Apr. 5-8	Chicago	L. M. FitzGerald Secy.	Roshek Bldg., Dubuque, Iowa
American Board of Pedodontics	July 29-31	Indianapolis	R. L. Ireland Secy.	College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Dental Assistants Certification Board	May 3 Oct. 8		F. Smith	23 W. 33 St., Bayonne, N. J.
American Dental Society of Europe	July 2-5	Knokke, Belgium	J. P. Molony Secy.	110 Harley St., London W.1, England

Name	Date	Place	Secy. or Chm.	Address
American Society of Oral Surgeons	July 30–Aug. 2	Chicago	A. R. Coxwell Exec. Secy.	2208 Dundee Rd., Louisville 5, Ky.
Ark-La-Tex Dental Congress	Aug. 18	Shreveport, La.	J. Wyrick Secy.	Texarkana National Bank, Texarkana, Texas
Arpa Internationale, Twenty-fifth Congress	July 7-12	Paris, France	A. J. Held Pres.	Institute Universitaire de Medecine Dentaire, 24 rue Micheli-du-Crest, Geneva, Switzerland
Berkshire Conference (Ninth)	June 15-19	Lenox, Mass.	I. Glickman Dir.	Tufts University, School of Dental Medicine, 136 Harrison Ave., Boston 11
British Columbia Dental Association	May 1-3	Vancouver	I. U. MacIntosh Secy.	624 Sixth St., New Westminster, B.C., Canada
British Dental Association	July 7-12	Dundee, Scotland	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London W.1, England
Canadian Dental Association	Oct. 5-8	Montreal	D. W. Gullett Secy.	234 St. George St., Toronto 5, Canada
Chicago Dental Society	Feb. 8-11, 1959	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Cleveland Dental Society	Apr. 28-30	Cleveland	G. A. Blizil Exec. Secy.	1220 Huron Rd., Cleveland 15
Council on Dental Education, Dental Aptitude Tests	Apr. 25, 26		S. Peterson Secy.	222 E. Superior St., Chicago 11
Endodontics, Second International Conference	June 22-28	Philadelphia	M. Kolb Secy.	4001 Spruce St., Philadelphia 4
European Organization for Research on Fluorine and Dental Caries Prevention, Fifth Congress	May 30-June 1	Brussels, Belgium	A. Syrrist Secy. Gen.	Ecole Dentaire Royale, Malmo, Sweden
European Orthodontic Society	July 4-8	Copenhagen, Denmark	A. Bjork	Royal Dental College, 4, Universitetsparken, Copenhagen, Denmark
Federation Dentaire Internationale, 46th Annual Meeting	Aug. 27-Sept. 3	Brussels, Belgium	G. H. Leatherman Secy.	35 Devonshire Pl., London W.1, England
German Cooperative Society for Research and Prevention of Dental Focal Infection	Apr. 9, 10	Wiesbaden, Germany	K. Thielemann	Rubensstrasse 28, Frankfurt/Main, Germany
National Board of Dental Examiners	Dec. 1, 2		G. J. Casey Secy.	222 E. Superior St., Chicago 11
National Dental Association, Inc.	Aug. 3-7	Pittsburgh	E. N. Jackson Secy.	P. O. Box 197, Charlottesville, Va.
Northeastern Society of Orthodontists	Apr. 29	New York	D. Mossberg Secy.	36 Central Park S., New York
Northern Brazil, First Congress	July 7-12	Macapa	J. M. Lima Gen. Secy.	Central Committee on Organization, First Congresso Nortista de Odontologia, Macapa, Amapa, Brazil
Northwest Academy of Dental Medicine	Apr. 22-26	Victoria, B.C., Canada	G. Underwood Secy.	Selling Bldg., Portland, Ore.
Odontological Society of Western Pennsylvania	Sept. 30-Oct. 2	Pittsburgh	H. D. Butts, Jr. Secy.	Jenkins Bldg., Pittsburgh 22
Pan-American Dental Congress	Nov. 18-22	Mexico City, Mexico	Secretary	Asociacion Dental Mexicana Sinaloa 9, Mexico 7, D.F., Mexico
Society Suisse d'Odontologie, Annual Congress	May 8-11	Geneva, Switzerland	Secretary, S.S.O.	Spitalgasse 37, Bern, Switzerland
Southeastern Society of Oral Surgeons	May 2, 3	Daytona Beach, Fla.	P. B. Whittington, Jr. Secy.	Medical Arts Bldg., Greensboro, N.C.
Southwest Society of Periodontists	May 3, 4	Waco, Texas	J. H. Swindle, Jr. Secy.	P. O. Box 3096, Westview Station, Waco, Texas

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Chicago 11, Ill. Box.....
Please be sure that the box number appears on the envelope.

PRACTICES AND OFFICES FOR SALE AND/OR RENT

CALIFORNIA — Orthodontist — design your own suite in dental building to be constructed in suburban Los Angeles. Building will feature garden suites, air conditioning and free off-street parking for doctor and patients. No orthodontist within five miles. Address A.D.A. Box No. 700.

•

CALIFORNIA—San Francisco Bay area. For lease, reasonable. The only five room dental suite in new medical-dental building in shopping center. Write to Dr. H. Pepper, 50 Edgewood Rd., Redwood City, Calif.

•

CALIFORNIA—Arcadia area—one suite left in modern medical building; other suites occupied by pediatrician, eye, ear, nose and throat specialist and professional pharmacy. Across street from busy Clinic and Emergency Hospital. Will arrange terms to suit. Knoll, 9678 E. Las Tunas, Temple City, Calif.

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CALIFORNIA — Los Angeles Beach area. Completely equipped dental building and high gross practice, $10,000 handles. Present dentist will stay with buyer for six months, then retire. Address A.D.A. Box No. 862.

•

COLORADO—For sale, $55,000 a year practice. Lovely new six room office building with two fully equipped operating rooms. Rapidly growing town; population 10,000; mountains; splendid climate; excellent hunting and trout fishing. Dentist leaving to specialize. Eqiupment and practice must be sold; will sell or lease building; $10,000 cash required. Address A.D.A. Box No. 842.

•

COLORADO—For sale or lease, busy two chair residential dental office in Denver. Address A.D.A. Box No. 904.

•

COLORADO — For sale. Lucrative practice and all new equipment. Two operatories, laboratory, business office, in new air-conditioned clinic building with ample parking space. Terms. Address A.D.A. Box No. 863.

•

CONNECTICUT—For sale. Three-chair modern, general practice dental office in air-conditioned building. $15,000, terms. Dentist, age 47, will stay with buyer for six months and share expenses, refer patients and then retire to Florida. Address A.D.A. Box No. 534.

•

CONNECTICUT—For sale. Two-chair fully equipped office, modern Ritter and S. S. White, in air-conditioned building; growing practice grossing over $20,000. Above average clientele in well established residential town. Leaving New England after sale. Address A.D.A. Box No. 864.

GEORGIA—For sale. Most unique first floor suite with reception room opening on to foyer of theatre lobby in Atlanta's exclusive northside suburb of Buckhead, drawing from an area of unbelievable purchasing power. Handsomely appointed throughout with beautiful reception room, two private offices, large secretary's area, roomy corridor and three operatories, two equipped with new Ritter Tri-Dents, Ritter x-ray and motor chairs; a third operatory with new S. S. White motor chair and Air Dent. Owner has practiced here for 30 years and has reputation for good dentistry, square dealing and at the best fees; general practice largely rehabilitative dentistry; five years remain on lease at $250 per month. Owner is ill but is able to make transfer of practice. The right man can acquire for something less than $20,000 with reasonable terms. Dr. J. Hugh Crossett, Buckhead Theatre Building, Atlanta 5, Ga.

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IOWA—For sale. Attractive two-chair office. Very active practice in pleasant southern Iowa town; population 6,000. Address A.D.A. Box No. 905.

•

KENTUCKY—For rent. New dental suite; three chairs, office, secretary's office, reception room, dental laboratory, dark room, recovery room, storage and toilet; air conditioned; in new doctors' building to be completed April 1 in Somerset, Ky., population 15,000; near Lake Cumberland. Can complete to own taste. Ideal for a dentist coming out of school or military service desiring to build a large practice. Write to C. K. Cundiff, Somerset, Ky., owner.

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KENTUCKY—Louisville. Two-chair dental office fully equipped; reception room furnished, laboratory, business and private offices in downtown professional building; will sell everything, $1,500; buyer must take two year lease; write 908 Francis Bldg., Louisville, Ky.

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MICHIGAN—For sale. Northwestern section, lower peninsula. Attractive brick and stone modern one-story dental building at present occupied by physician. Room for combined offices or living quarters. Excellent opportunity. Address A.D.A. Box No. 822.

•

NEW JERSEY—For sale. Long established two-chair office, ground floor, fully equipped, excellent location. Bound Brook. Reasonable. John Hoelig, Realtor, 266 W. Union Ave., Bound Brook, N. J. Phone Elliot 6-0097.

•

NEW JERSEY—Ridgewood. For rent. Fine going dental practice, excellent location. Up-to-date equipment. Easy terms. Connecting living quarters, if desired. Write to Mrs. A. W. Coolbaugh, 107 North Monroe Street, Ridgewood, N. J.

NEW JERSEY—Bergen County. For sale. Beautiful two-chair dental office; large laboratory and waiting room; gross $30,000; a good man definitely can do better; have other interests; reasonable. Address A.D.A. Box No. 906.

•

NEW MEXICO—Excellent opening in mining and ranching community. Fully equipped two-chair office in drawing area of 30,000 population. Large office and residence combination for sale or rent. Ideal climate; beautiful southwestern section of state. Altitude 5,200. Opportunity created by illness. Address A.D.A. Box No. 907.

•

NEW YORK—For sale. General dental practice; established 80 years; upstate New York; small town; low overhead; attractive modern two-chair Ritter equipped office; x-ray; also $35,000 home available. Leaving state. Address A.D.A. Box No. 908.

•

OHIO—Attention June graduates. Available September, fully equipped, air-conditioned one-chair office for sale in Akron. Second operatory is fully wired and plumbed. Ground floor. Practice established three years; leaving to specialize. Address A.D.A. Box No. 909.

•

OHIO—For sale. Excellent opportunity, two-chair office fully equipped with exception of one operating room. Located in southern Ohio college town with large drawing area. Priced right. Address A.D.A. Box No. 910.

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OHIO—Plumbing for one operatory also laboratory, business office and reception room. Will redecorate to suit. The Walpark Realty Company, Park Ave. W., & Walnut St., Mansfield, Ohio.

•

PENNSYLVANIA — Levittown. For sale. Fully equipped modern ranch type dental office with adjoining income-producing three room apartment. Must sacrifice. Going into specialty. Write to P. O. Box 55, Penndel, Pa.

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PENNSYLVANIA — Established two-chair practice in western Pennsylvania for sale or lease; 1957 Ritter motor chair H-3 unit; 1957 G.E.-90 x-ray; Petan autoclave American cabinet; 1957 N_2O McKesson Euthesor; Ritter pump chair and Tri Dent Unit; complete laboratory and dark room; all equipment jade green; dentist specializing; address A.D.A. Box No. 871.

•

VIRGINIA—For sale. Attractive two-chair office on ground floor in new medical building. Modern Ritter equipment; established practice; growing industrial town near large city. Reason for sale—health. Address A.D.A. Box No. 911.

•

WASHINGTON—For sale. Modern two-chair dental office and home. Ideal for young dentist to get started in fast growing eastern Washington area. Will finance. Owner leaving state. Address A.D.A. Box No. 912.

OPPORTUNITIES AVAILABLE

CALIFORNIA—Pedodontist desires full time associate. Please give full details in first response. Address A.D.A. Box No. 913.

•

DISTRICT OF COLUMBIA — Periodontist wanted. Full time or part time for group practice in Washington, D. C. Prefer man with recent training and Board qualifications; write to Dental Director, Group Health Association, Inc., 1025 Vermont Ave., N. W., Washington 5, D. C.

•

FLORIDA—Indiantown. Seeks dentist with Florida license to share offices with physician in new community medical building; excellent opportunity; no dentist in this area; growing rapidly with new Pratt & Whitney plant in immediate area; prefer reasonably mature man with sensible outlook, possessing own equipment (preferred), possibly semi-retired. Write to Indiantown Company, 706 Chase Ave., West Palm Beach, Fla.

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ILLINOIS—Wanted, one associate with military service completed. Located in busy metropolitan "Heart-of-Illinois" area. Write to Dr. C. K. Becherer, 223 E. Washington St., East Peoria, Ill.

•

MASSACHUSETTS — South Shore. Opportunity for qualified dentist. Three-chair active general practice established 14 years; full equipment, hygienist's practice and part-time associate. Immediate large income. Address A.D.A. Box No. 914.

•

NEW JERSEY—Orthodontist wanted for a specialty group practice in ideal suburban community. Excellent part-time or full-time opportunity for unusual development. State qualifications—confidential. Address A.D.A. Box No. 915.

•

PENNSYLVANIA—Western section. Associate wanted with or without equipment. Modern, just built 11-room office with five operating rooms. Give all details. Address A.D.A. Box No. 916.

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TEXAS—Internship. Dental rotating; American Dental Association approved; in 1,300 bed general hospital affiliated with Texas Dental College; $2,130 per annum; well rounded training; opportunity for research. Write to Chief, Dental Service, VA Hospital, Houston, Texas.

•

WASHINGTON — Foreign missionary work. Excellent opportunity for qualified men in all parts of the world. For details apply to The Missionary Dentist, 5543 25th Ave., N. E., Seattle 5.

OPPORTUNITIES WANTED

ALABAMA—Tennessee licensed dentist age 26, single, University of Tennessee graduate, desires association or partnership in established practice with older dentist. Interested in all phases of dentistry. Military obligation completed July 1958. References. Write to Captain Jack Bern, 85th Evacuation Hospital, Fort Polk, La.

•

Recent graduate wishes to locate in Arizona; desires location or opportunity for association; military service completed; will take Board this summer; references furnished on request. Address A.D.A. Box No. 874.

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CALIFORNIA—Orthodontist age 35, married, completing graduate training at University of Illinois in or about June 1958, seeking association in busy orthodontic practice with view to partnership or purchase. Address A.D.A. Box No. 917.

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CALIFORNIA — Dentist, 1956 California graduate; military obligation completed May 8, age 28, married, two children. Wish

to lease space in growing northern California community. Please state full details in first letter. Write to Captain W. Penner, 1019 10th St., Alexandria, Va.

•

COLORADO licensed, retired army dentist, age 60, good health, desires association with ethical practitioner or group; operative dentistry and periodontics preferable; location unimportant. Address A.D.A. Box No. 877.

•

Orthodontist desires association in California on completion of military service in August 1958. University trained in edgewise technic. Deryck G. Nuckton, 80 Crescent Dr., Palo Alto, Calif.

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Orthodontist—California licensed, completing university training in June in the edgewise technic, desires full or part time association or location in southern California; age 29; military obligation completed. Address A.D.A. Box No. 876.

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CALIFORNIA — Association desired; 1956 Minnesota graduate, age 30, desires association in California; leaving military service June 9. Write to Dr. Gerald Adler, Dental Service, Fort Ord, Calif.

•

FLORIDA licensed general practioner, well qualified, age 41, married, now practicing in midwest, wants to live in Florida and desires pleasant association with congenial, ethical dentist; coastal area preferred but not essential. Address A.D.A. Box No. 878.

•

MARYLAND — Young, married, licensed dentist with military service completed desires general practice association, employment or opportunity to buy general practice in Baltimore or general vicinity. Address A.D.A. Box No. 918.

•

NEW YORK—Military obligation complete in July. Desires location in eastern New York, Hudson Valley area preferred. Interested in new location or association leading to purchase of practice. Address A.D.A. Box No. 919.

•

NEW YORK — Illinois licensed, National Boards. Age 29, married. General practitioner experienced in all phases of dentistry. Completing military obligation this October. Desire association or other opportunity in New York City or Long Island vicinity. Address A.D.A. Box No. 920.

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NEW YORK — Connecticut licensed, many years' experience; wishes association or partnership in busy, lucrative practice. Cash available; can contribute valuable equipment; no military obligation; married. Address A.D.A. Box No. 921.

•

NEW YORK—1955 graduate, married, age 27, completing military service September 1958, desires employment or association in central state, Long Island or Westchester; have own equipment if needed. Address A.D.A. Box No. 889.

•

OHIO licensed dentist, National Boards, 28, married, native Clevelander, completing military obligation early August 1958, desires employment, possibly leading to association in general dentistry within greater Cleveland area or vicinity. Experienced in all fields of dentistry; especially fond of children's dentistry. Address A.D.A. Box No. 922.

•

OREGON—Graduate licensed general practitioner arriving Oregon in August desires association with oral surgeon, prosthodontist, group practice or practice for sale. Northwestern Oregon. Write to Dr. Lewis B. Coover, Shelby, Ohio.

•

Dentist in general practice for 25 years desires governmental, industrial or public health position. Licensed in Massachusetts and Maryland. Address A.D.A. Box No. 928.

•

Orthodontist—Pennsylvania. Recently completed university training; formerly general practitioner desires to purchase orthodontic practice. Will consider association leading to purchase or partnership or group practice association. Address A.D.A. Box No. 927.

•

Oral surgeon age 30; married, three years' hospital training, military obligation completed; desires any opportunity in oral surgery. New Jersey and New York licensed. Address A.D.A. Box No. 926.

•

Foreign service—young general practitioner desires position with commercial organization, school, hospital, clinic or government outside continental limits of United States. Veteran, good health, hospital experience. Address A.D.A. Box No. 925.

•

1956 Minnesota graduate, two years general practice, age 25, family, desires to enter field allied to dentistry; research, development, laboratory, etc. Address A.D.A. Box No. 924.

•

General practitioner, unmarried, under 30, desires overseas position with industry, government or foreign university; experience includes administration, teaching, military and private practice. Address A.D.A. Box No. 896.

WANTED TO BUY

Old and used dental books, journals, prints. Leo L. Bruder, 1 DeKalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

FOR SALE

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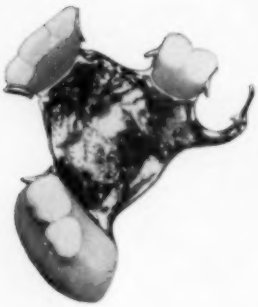

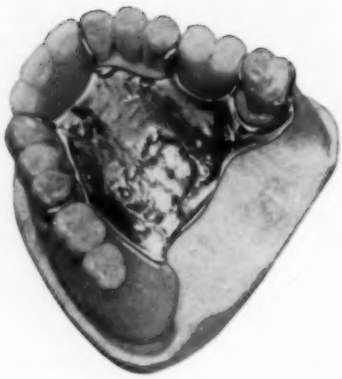

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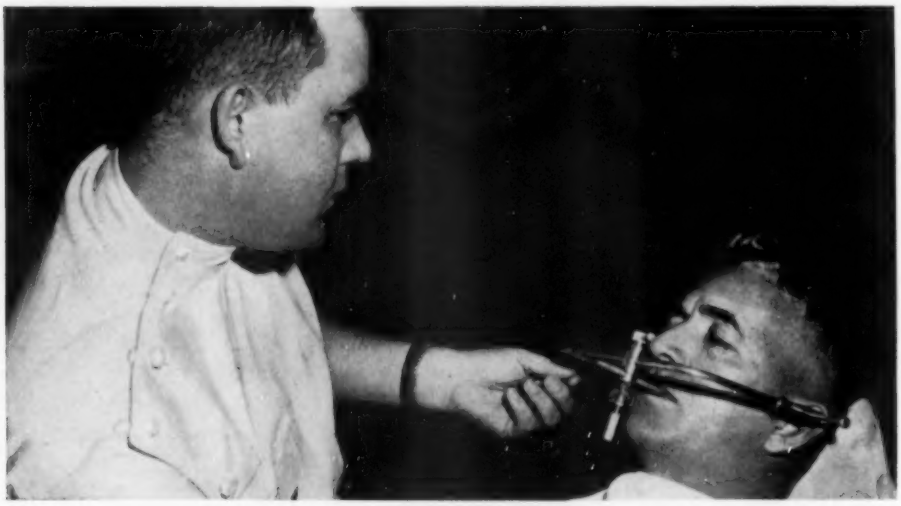

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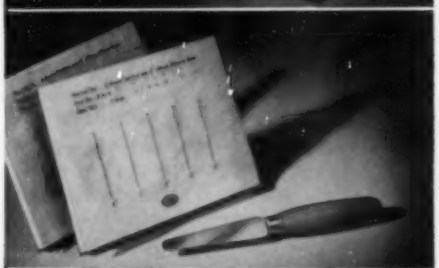

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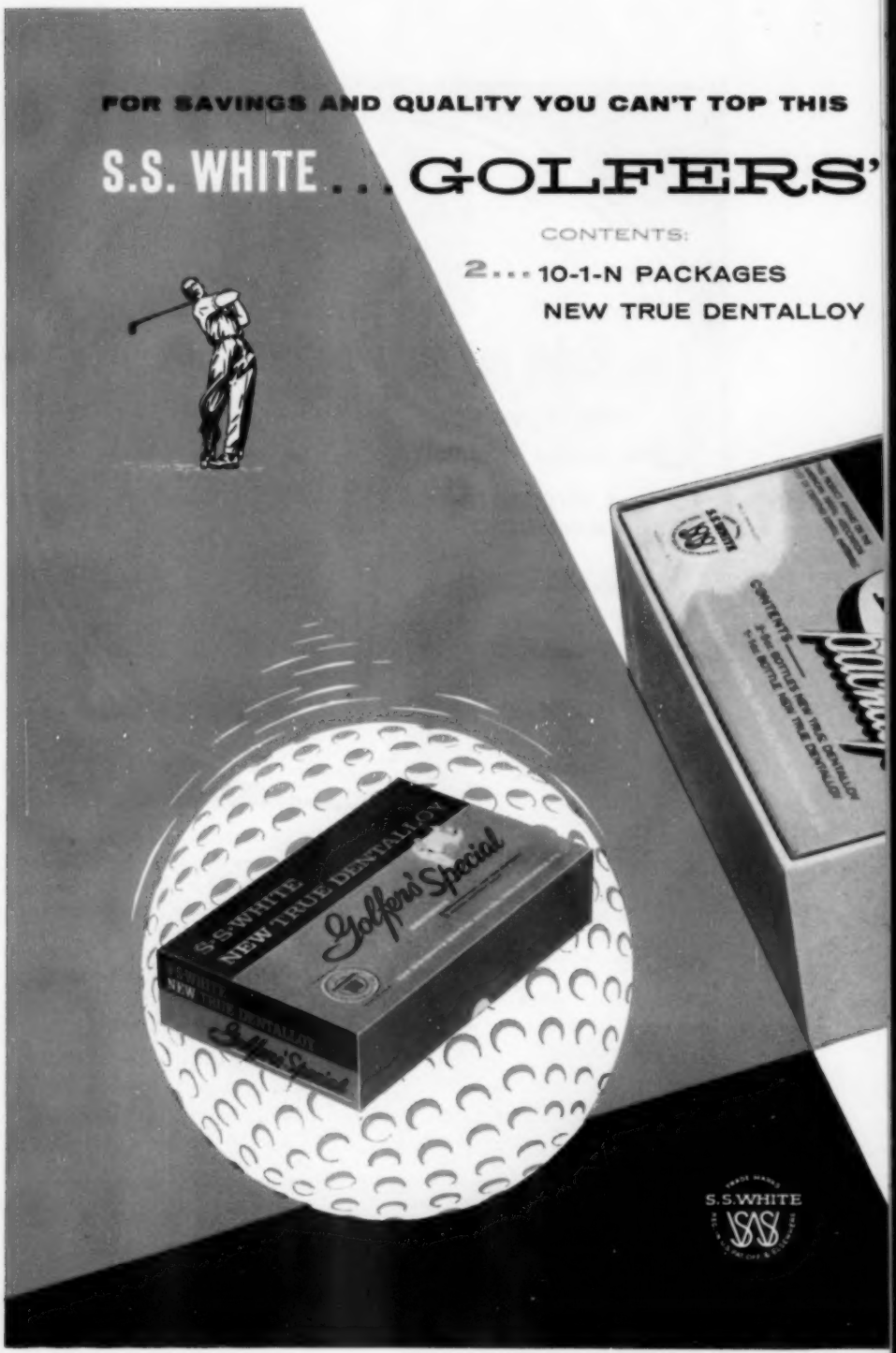
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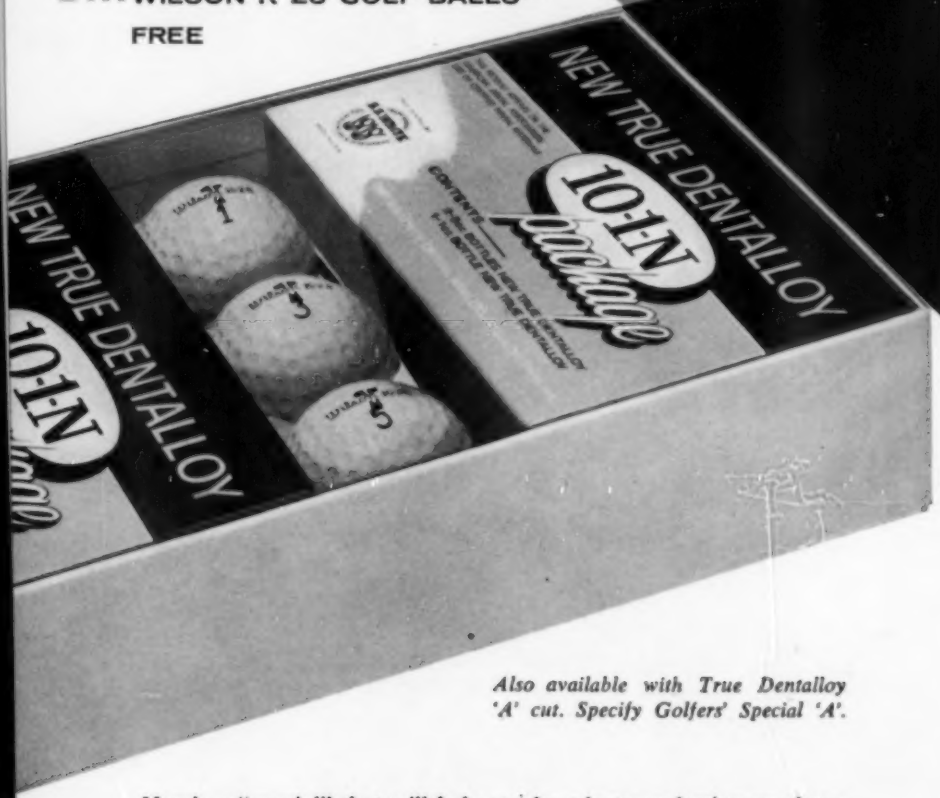

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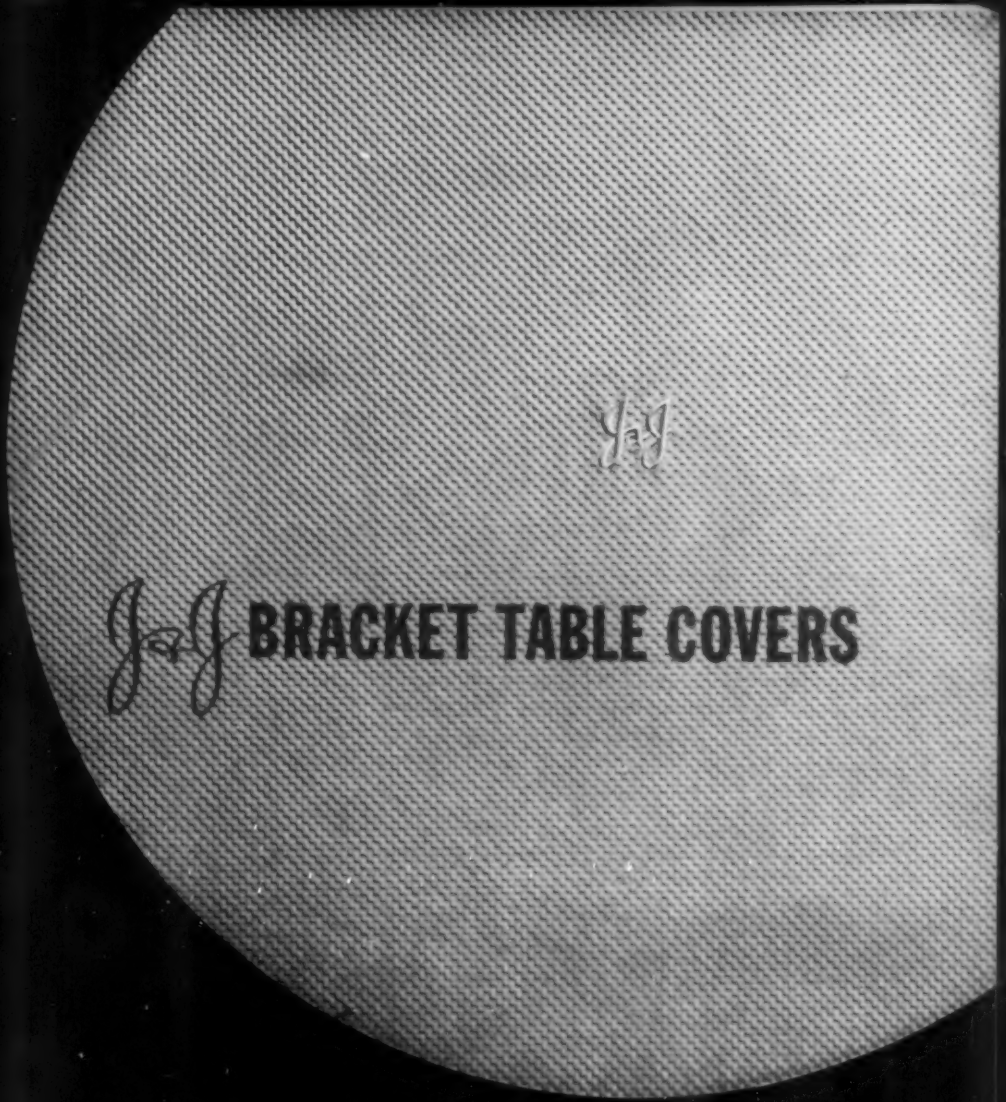

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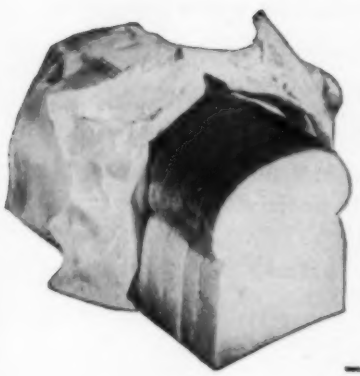

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[Council on Dental Health: J. Am. Dent. A. 47:387 (Oct.) 1953.]

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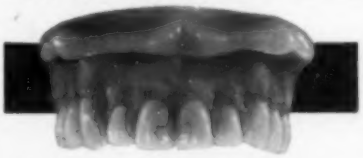

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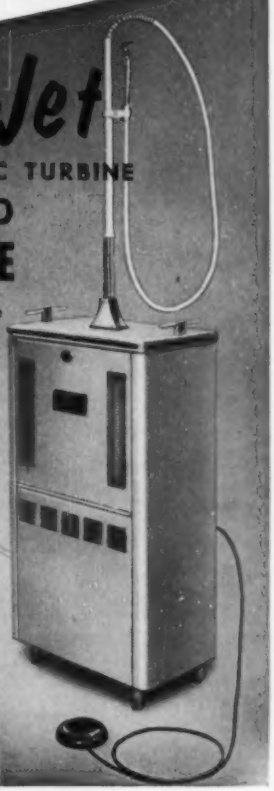

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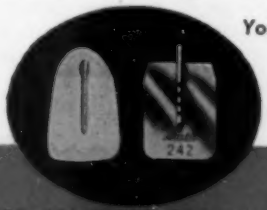

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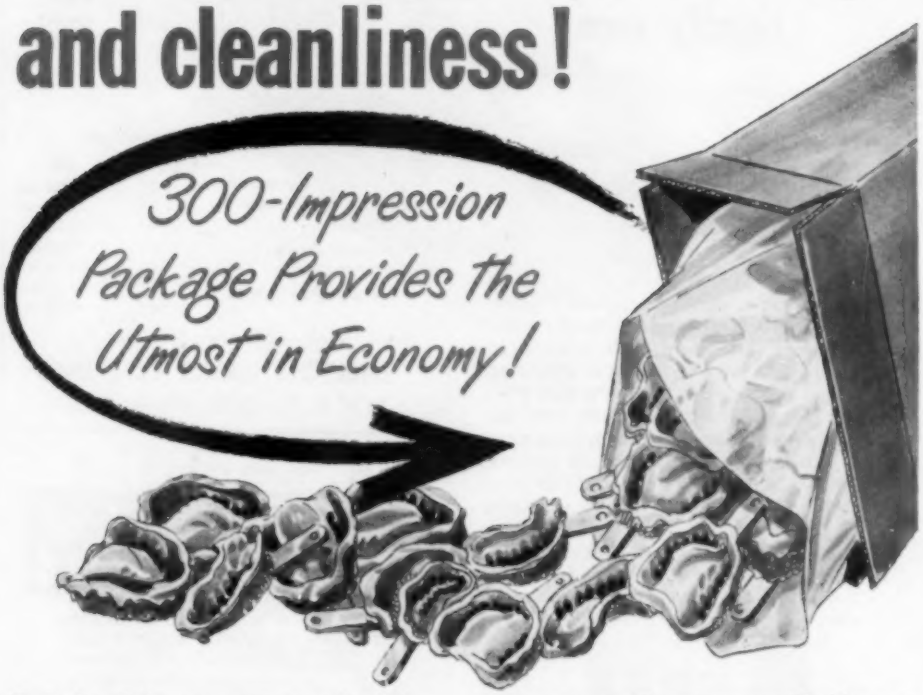

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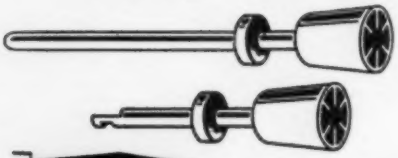

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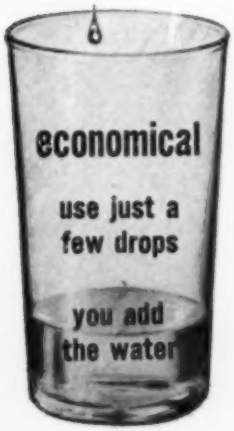

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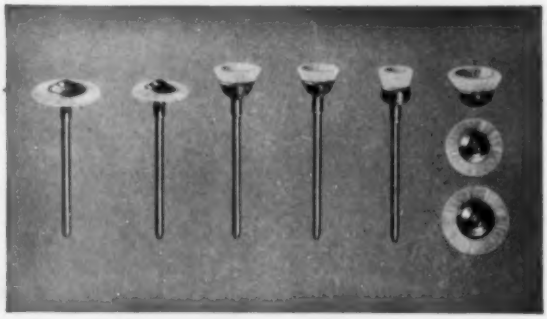

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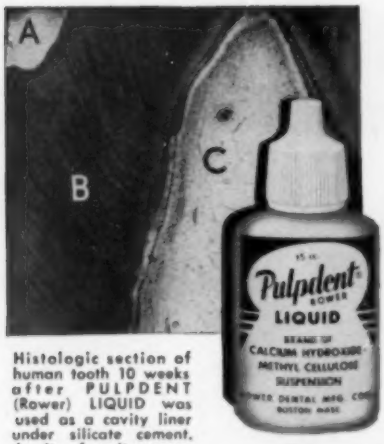

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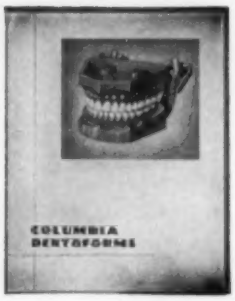

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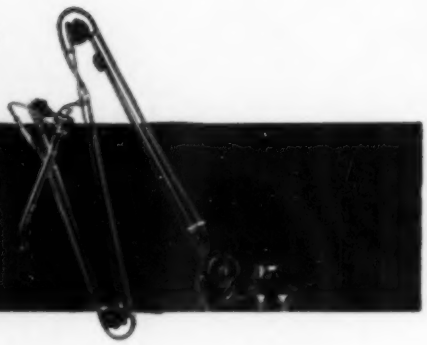

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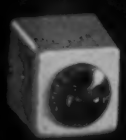

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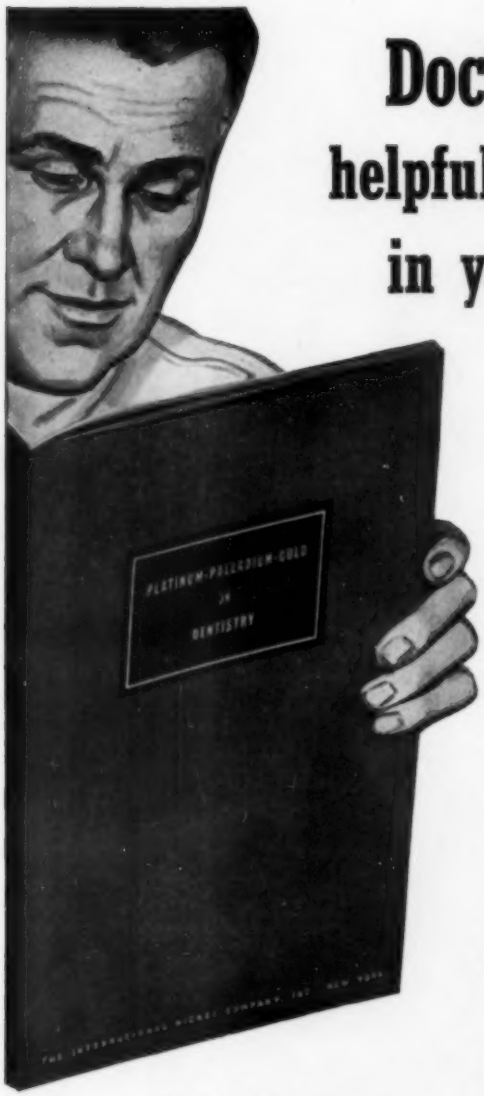

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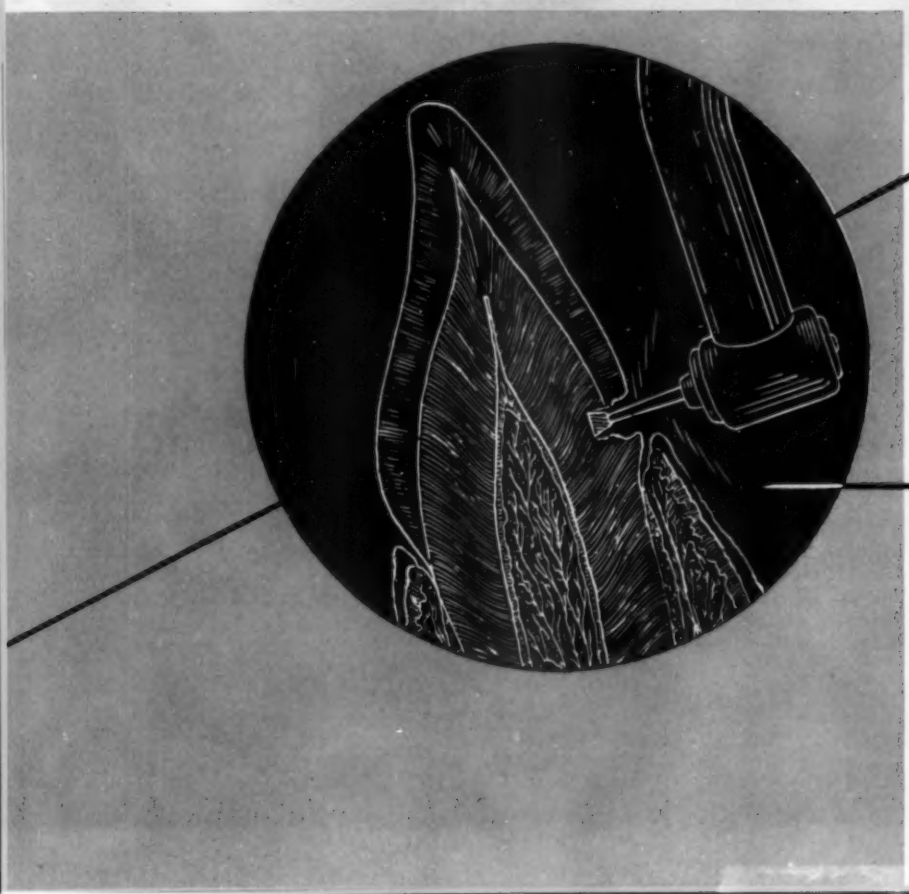

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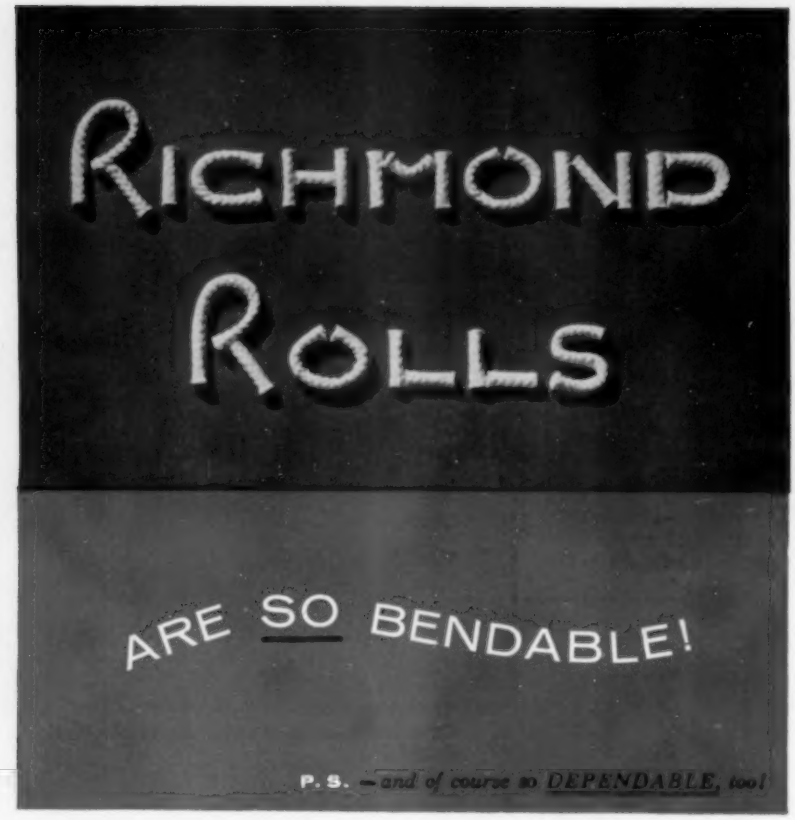

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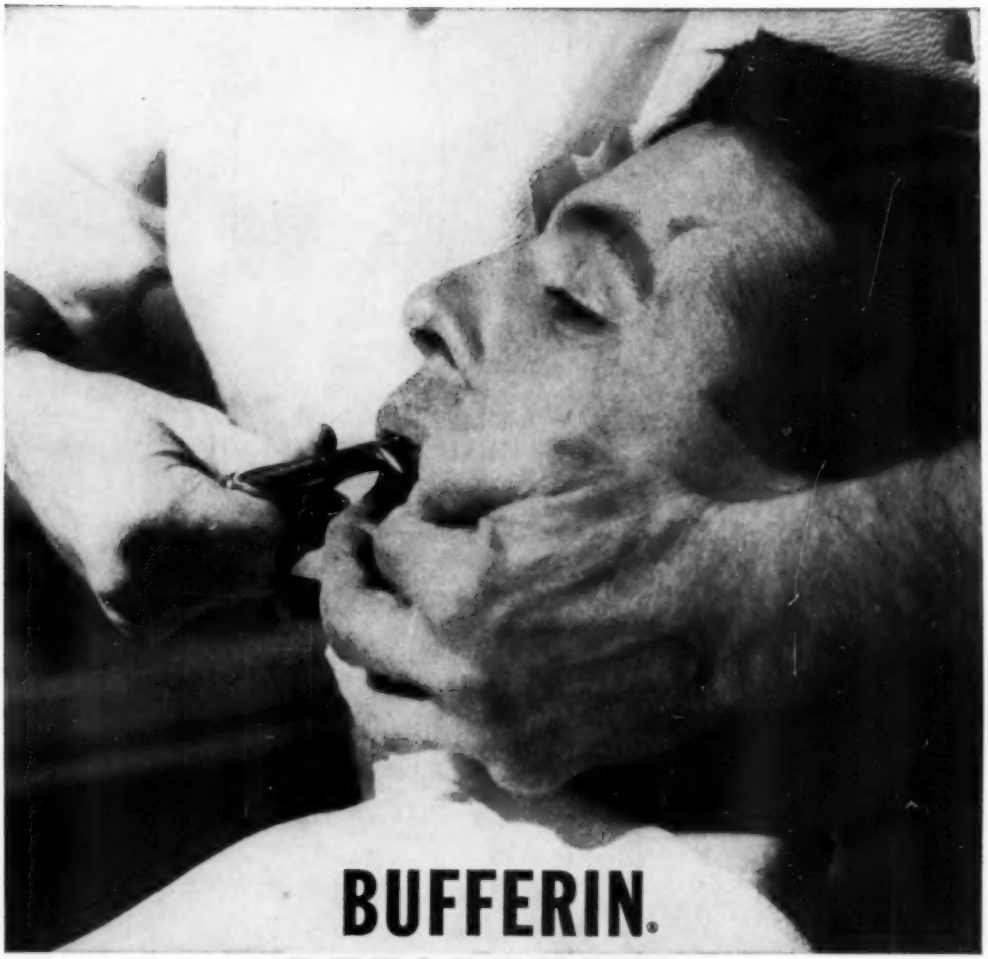

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